

FAILURE TO REGULATE— ASBESTOS: A LETHAL LEGACY

HEARING BEFORE A SUBCOMMITTEE OF THE COMMITTEE ON GOVERNMENT OPERATIONS HOUSE OF REPRESENTATIVES NINETY-EIGHTH CONGRESS FIRST SESSION

—
JUNE 28, 1983
—

Printed for the use of the Committee on Government Operations



U.S. GOVERNMENT PRINTING OFFICE

25-994 O

WASHINGTON : 1983

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FAILURE TO REGULATE—ASBESTOS: A LETHAL LEGACY

TUESDAY, JUNE 28, 1983

HOUSE OF REPRESENTATIVES,
MANPOWER AND HOUSING SUBCOMMITTEE
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:40 a.m., in room 2247, Rayburn House Office Building, Hon. Barney Frank (chairman of the subcommittee) presiding.

Present: Representatives Barney Frank and John R. McKernan Jr.

Also present: James M. Dolan, Jr., staff director; June Saxton, clerk, and Nan Elwood, minority professional staff, Committee on Government Operations.

OPENING STATEMENT OF CHAIRMAN FRANK

Mr. FRANK. The hearing of the Subcommittee on Manpower and Housing of the Committee on Government Operations will come to order.

We meet today to talk about the costs involved when this Government fails to regulate with the particular example of asbestos.

We are going to begin with an opening statement from the ranking minority member from Maine, Mr. McKernan.

Mr. MCKERNAN. Thank you, Mr. Chairman.

I want to commend you for scheduling these hearings. I want to apologize to Congressman Miller and also to those of you in the audience, I am going to have to leave probably before Congressman Miller even makes his opening statement because I have a markup in another committee but I will be back within the hour.

I commend you all for coming. I do have a short statement that I would like to read because I think this is an important issue.

I really appreciate both the seriousness of asbestos in the workplace and the wide difference of opinions on how best to address this problem. So I welcome the hearings and, Mr. Chairman, again, I commend you for focusing this subcommittee's attention on the cost and benefits of regulations.

As you and I have discussed before, the question of asbestos is a serious and troubling one that has been debated for years without any real consensus of conclusions other than the fact that asbestos handled improperly or carelessly can be very dangerous to one's health.

When this subcommittee, in March of this year, went to Kittery, Maine, in my district, we heard from workers at the Kittery-Portsmouth Naval Shipyard and it convinced me that the Government must do everything possible to protect our workers from the hazards of asbestos.

As I said at that hearing, however, the issue is really not that asbestos is dangerous but how it is handled and what precautions are taken to protect our citizens.

It is a fact of life that asbestos in large quantities has been used in ship construction for years, even as far back as World War II when the Government commandeered all the asbestos in the United States for naval and other military uses.

As we heard in our Kittery hearing, it is also a sad fact of life that the Government, private industry, and even the public, have been painfully slow in recognizing and dealing with the various problems associated with asbestos.

We will be hearing today from several witnesses who will tell us that the costs to regulate the dangerous substances like asbestos are invariably less than the inevitable costs of nonregulation.

There is a good case to be made for that argument and I certainly welcome frank and open discussions on the costs of nonregulation and perhaps, more importantly, on what the proper role of the Government is if we are going to regulate.

While debating that point, though, I hope that we do not lose sight of the fact that encouraging progress is being made at OSHA. I really hope that we don't overlook that because I believe they are starting to make a vigorous and effective standard on asbestos, a top priority of that agency. I welcome that progress and I frankly find it refreshing that the debate at OSHA is not over the absence of a standard but over the possibility of an even tougher standard than is already in existence.

I am sure that the chairman will join me in agreeing that we, as a subcommittee, look forward to working with the Federal agencies to make sure that the standard is tough enough, that it is effective, and that the regulation that does go into effect is going to work at the lowest possible cost to the Government.

Mr. Chairman, again, I thank you and I will be back.

Mr. FRANK. Thank you, Mr. McKernan.

I would just like to say that one of the purposes that motivated this hearing is the seriousness of asbestos. We will, along with other subcommittees of the Congress, focus on the effort to provide protection to Americans, not just workers, schoolchildren, and others, from this deadly substance.

There is also a broader issue at stake and that is the proper role of regulation in our society. We have heard a great deal in recent years about the costs of regulation and a lot of talent and energy has gone into calculations which tell us, in some cases, we lose a certain amount of productivity. It costs us a certain amount of money when we regulate. It is true, regulation bears a cost.

We have also looked at the benefits of regulation. What has not been looked at is the cost of not regulating. Is it possible to total up what the costs are of a particular regulation, and be accurate?

There was insufficient attention given to what it cost not to regulate. If there had been an OSHA in 1930 and it had banned asbes-

tos as it seems to me it then would have, the savings to this society would have been enormous.

As we calculate today what the role of this Government ought to be in adopting, tightening, or loosening regulations, we have to keep sight of the role of Government.

The costs of not regulating in the area of asbestos have been enormous to this society, not just in human pain, suffering, death, and illness. But for people who seem somehow to be able to rise above such emotional considerations, the cost of not regulating has been very substantial in money, in work hours lost, in medical bills, and in physical repairs in school buildings. That is a subject we will deal with later, the cost of education alone.

That is one of the points that seems to me has been lost and has to be emphasized. The costs of not regulating can be to our society greater than the costs of regulating. I think in the case of asbestos we face an enormous set of problems: the private insurance system, the Bankruptcy Act, the public education system, and health of workers. A whole range of institutions are stressed very badly by the failure of this society to regulate at an appropriate point years ago.

So, in addition to focusing on the specific question of asbestos, I hope through the work of this subcommittee now and in the future that we can also focus on the costs that a society incurs when it fails to provide the minimal protections that its citizens are entitled to.

We will begin with an individual who I think more than anyone else in the Congress has been working hard to deal with the problems that are the legacy of our failure to regulate asbestos, Congressman Miller, who is the chairman of the Labor Standards Subcommittee of the House Committee on Education and Labor.

Mr. Miller.

STATEMENT OF HON. GEORGE MILLER, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF CALIFORNIA

Mr. MILLER. Thank you, Mr. Chairman. I want to thank you and the members of the committee for inviting me to appear before this subcommittee and to congratulate you on your leadership in not just holding these hearings but in the whole discussion of the questions of cost-benefit and regulation.

There is no better time in our history to be making an honest assessment of the cost of failing to regulate adequately the workplace exposure to harmful substances.

The asbestos situation is a tragic example of the immense cost and enormous human suffering which results from that exposure. But it is only one example.

Asbestos has long been recognized as one of the most dangerous substances in the workplace. And yet, when the OSHA undertook the establishment of a safe threshold level for asbestos exposure, the asbestos industry mounted a comprehensive effort to fight back the OSHA's proposed standards.

Regrettably, the view of industry prevailed, and we put into place an asbestos standard which is now generally regarded as tragically inadequate.

And interestingly enough, in the court cases where industry is battling back lawsuits by workers, we find the industry telling the court if the Government had only regulated us more this would not have happened and it is raised as a matter of defense.

And yet, in 6 years of hearings in our subcommittee, we have found that industry has fought every effort and regulation. And during these 6 years in the subcommittee, we have held hearings as the result of that policy and earlier unsuccessful efforts to control asbestos exposure.

Tens of thousands of American workers have become disabled or have died as a result of the asbestos disease. Every year through the end of this century, another 10,000 workers will die or become disabled as a result of asbestos exposure which has already occurred, a quarter of a million casualties in all.

Inadequate controls of asbestos and the resulting number of illnesses have spawned the most massive compensation and litigation crisis in history.

The 51 workers' compensation programs in the States have proven to be totally incapable of effectively responding to the claims of asbestos and other occupational disease victims. The small number of workers who are awarded compensation benefits receive a meager amount.

The failure of the responsible industry to pay for the disabilities suffered by their workers has passed the cost of compensating occupational diseases to the taxpayers of this Nation.

Through social security, medicare, veterans' assistance, and other publicly financed programs, the taxpayers spend \$3 billion a year in an inadvertent subsidy of hazardous industries.

These disabled workers and their survivors, who are left without income or medical support, turn to the courts for compensation through third-party litigation, swamping the judicial machinery of this Nation.

As of this time, approximately 25,000 lawsuits have been filed by asbestos victims, tying in knots virtually every court in the land. And this litigation has been unsuccessful in compensating the victims.

While a few plaintiffs have received large judgments and settlements, most who receive anything at all receive a very small amount.

Only about 10 percent of the lawsuits have been finally resolved at all, and the remaining plaintiffs continue to suffer and many will die before they get their trial dates.

Court costs and attorneys' fees are immense. Witnesses have estimated that for every dollar that goes into this litigation process, no more than 10 or 15 cents ends up in the pockets of the victims.

Litigation, while producing paltry payments to victims, has driven three major companies into the bankruptcy courts. This situation imperils not only industry, but the ability of a quarter million future injury victims to receive compensation.

Obviously we need a different system for compensating victims of asbestos disease. Just yesterday, the Subcommittee on Labor Standards completed hearings on H.R. 3175, my bill to establish a rational and responsive compensation system for the victims of asbestos-related disease.

Interestingly, we have asked that this entire endeavor be financed by the industry that is responsible for placing this in the stream of commerce.

I am heartened by the response to this legislation. Organized labor, the asbestos industry, the affected employers and insurance carriers, have all agreed that the bill represents a sound route for a compensation crisis, and are working with us toward advancing that legislation.

Compensating the victims of past practices is only one step. We must also take those actions which are needed to prevent another generation of victims.

We must commit ourselves to a policy of controlling workplace exposure to toxic substances.

The cost of saving a few dollars on this quarter's bottom line by delaying installation of effective engineering controls will be millions of dollars of compensation down the road, and incalculable human misery.

Workers shouldn't have to make this tradeoff in order to protect their jobs. The families of workers shouldn't have to make this tradeoff in order to exist. No civilized society should expect workers to sacrifice their health and their lives for such short range objectives.

Mr. Chairman, in closing I would like to add a word about the very serious situation faced in schools throughout this country that contain hazardous asbestos.

Coincidentally, today, June 28, is the date by which all 110,000 of the Nation's public and private elementary schools are to have complied with the EPA requirement to inspect their facilities for the presence of hazardous asbestos-containing materials.

It is expected that some 14,000 of these schools will find asbestos materials and will be required to remove or contain that material to protect the health and well-being of both school employees and the students.

So we find that the asbestos problem cuts across our society exacting a tremendous cost, both economically and physically for those involved.

And, again, I would welcome this committee's effort to try to look at what kind of rational regulation is proper and what, in fact, it will really mean in terms of the benefits that it can generate, not just for the workers but for our entire society, and the costs that we are now paying for the past generations. And what steps we can take in terms of prevention for future generations.

Thank you.

Mr. FRANK. Thank you, Mr. Miller.

The work you have done has been very important.

I would like to ask you one specific question. You raise the subject of schools. Obviously, the notion of schoolchildren being exposed to asbestos, is a pretty chilling one.

You chaired a hearing a couple of months ago, Education and Labor, involving the schools and the role of EPA. Did EPA give you an assessment of where we are today with regard to schools and their compliance with notification on asbestos?

Mr. MILLER. They gave us an assessment of where they are. I certainly didn't find it satisfactory. I doubt that you would. What, in

fact, we found out is that standards have been delayed. They delayed in issuing the inspection rules and as a result there has been a great deal of confusion among school districts as to exactly how they are to proceed.

One of the tragic facts we found out is that in fact nationwide, we are stuck with a staff of some 10 individuals along, I believe, with full-time volunteers, to monitor 110,000 schools.

A person from the Southeast of this country estimated that it would take 7 years and 6 additional staff people and \$1 million to monitor the 17,000 schools within his jurisdiction.

So I think what we see is no sense of urgency at EPA. I just received a letter, as a matter of fact, yesterday, from an individual at EPA suggesting that the full effects of this inspection rule will not be known until some time in 1984.

I would hope that you would consider, and other members of this subcommittee, would consider along with my committee and I think concerned members on the Appropriations Committee that are having problems with asbestos in the school, writing Mr. Ruckelshaus and explaining to him that this is a matter of some concern and urgency for Members of Congress who are being besieged by schools that now have detected a problem. EPA simply, in the past, has historically not responded to this problem with any sense of urgency at all.

Mr. FRANK. On that subject, having found it, what do we do about it? It is an expensive process. I have in my own district several municipalities which are faced with financial problems. They have an unanticipated cost to remove asbestos that was put in years ago. Nobody existed to tell them that it was dangerous.

You got a bill through a couple of years ago, in 1980, to authorize some funding for that.

What is the status of that and where do we go from here?

Mr. MILLER. We will be seeking an effort in the Appropriations Committee to fund Public Law 96-270, the Asbestos School Hazards Detection and Control Act, which provides for \$150 million. We certainly don't expect to get that full amount but I think what you have found out is that your district is not atypical and that this is going on nationwide.

We are hearing from Members all over the country who are hearing from their local school districts regarding the immense cost of the removal of this material. People consider the cost-benefit of regulations and review the testimony given our committee about the special hazard children share in the failure to properly use and contain asbestos. There is a great deal of concern among the scientists and the medical profession that they may be more susceptible and we may, in fact, be incubating another generation of asbestos-related victims in our public schools.

Again, I would ask for your help in going to the Appropriations Committee to secure that funding so those schools which have already detected that they have a hazard that exceeds what we would allow, even under what I believe is an inadequate OSHA standard for workplace exposure. We have children that are exposed there hours and hours, and days and days of the year, along with the employees. We should make an effort to remove that hazard from those individuals.

Mr. FRANK. As it stands EPA is doing very, very little to enforce any kind of inspection requirements on the schools. We have got a problem. We know there is a significant amount of asbestos in the schools in this country, and our children are being exposed to it.

I am wondering if you think we might possibly be able to persuade the President of the United States that protecting children from asbestos exposure is basic and that as we get back to basics maybe worrying about the terrible harm that asbestos causes could come within his newly kindled concern in education?

Mr. MILLER. I would hope so because it would be darn frightening to suggest that we are going to extend the schoolday only to continue to have those children spend a longer time in a hazardous environment.

I think the real test is we have seen the statements now by Mr. Ruckelshaus who has taken charge of EPA, and said that he wants to put back a sense of purpose, a sense of mission. There is really very little argument about what the prolonged exposure to asbestos can do to you.

There is some argument about what the casual exposure of asbestos can do to you.

It is just a question of whether we want to gamble with the lives of those children in creating this next generation.

I think we have an opportunity to prevent it and it requires some commitment.

I would hope that EPA would start to foster that under its new leadership.

It is very clear that there was no interest in this subject at EPA prior to the new administration. We simply hope that your oversight and the oversight of our committee will inspire them to take on a mission that the Congress has asked them to do but which has been bungled to date.

I think your subcommittee has the ability to get their attention.

Mr. FRANK. Sometimes I get the sense they are afraid if they help people find the problem, they might be asked to help finance its alleviation. When we are talking about kids' health, I would hope that wouldn't get in their way.

Mr. MILLER. Thank you. And thank you for the opportunity to testify.

Mr. FRANK. Thank you very much.

Our next witnesses will be Dr. William Nicholson from the Environmental Sciences Laboratory, Mount Sinai School of Medicine, and Dr. Russell Settle, associate professor of economics, University of Delaware, and visiting associate professor of economics, the Maxwell School, Syracuse University.

Gentlemen.

STATEMENT OF WILLIAM J. NICHOLSON, Ph. D., ASSOCIATE DIRECTOR, ENVIRONMENTAL SCIENCES LABORATORY, MOUNT SINAI SCHOOL OF MEDICINE

Dr. NICHOLSON. Thank you, Mr. Chairman.

My name is William J. Nicholson. I am an associate professor of community medicine and associate director of the Environmental Sciences Laboratory of Mount Sinai School of Medicine.

Since 1969, my work at Mount Sinai has been largely concerned with the quantification of health effects associated with asbestos exposure. In this activity I have conducted industrial hygiene surveys, and clinical or statistical epidemiological studies of asbestos disease.

I have recently been concerned with the mortality experience that might be projected from past exposures beginning in 1940 to asbestos in a variety of trades and occupations.

The results of this research illustrate the tragic consequences of our past inadequacies in controlling asbestos.

From an analysis of exposures in 11 major occupational categories, it is estimated that from 1980 onward there will be 350,000 premature deaths of asbestos-related cancers from exposures that occurred between 1940 and 1980.

In addition to deaths from malignant disease, asbestos will claim other lives.

The toll is even extended by deaths that are occurring among individuals who simply lived with asbestos workers and among people who were exposed in other than occupational circumstances.

You have heard already of the concern for asbestos exposures to our schoolchildren.

In my testimony I have submitted a table that lists the estimated number of deaths by occupation along with recent data on the possible number of individuals who were exposed to asbestos in these different work activities.

A review of these data demonstrate that most deaths will occur in individuals who were exposed to asbestos fibers released during the installation, repair, or removal of thermal insulation materials containing asbestos.

Over 70 percent of the projected mortality can be associated with this use of asbestos.

I might point out that of the 350,000 deaths, roughly 120,000 are estimated to occur among individuals in the construction trades, and about 74,000 among individuals that were exposed by virtue of their work in the shipbuilding industry.

Ironically, most of these individuals' jobs did not directly involve the use of asbestos, they were simply working nearby when insulation application or removal work was underway.

The asbestos fibers did not respect craft lines. Electricians, carpenters, plumbers, and others working near insulators would breathe the dust as well as those directly using the asbestos material.

I was requested to address the question of what would have been the consequences had our current standard of two-fibers per milliliter been in force and complied with since 1940. Table 1 lists the estimated minimum number of deaths that might have been avoided in each trade with potential asbestos exposure.

Overall, at least 280,000 of the 350,000 premature deaths could have been prevented by the vigorous application of the current asbestos standard. By application of that standard, I mean the prevention of any exposure that would exceed two fibers per milliliter. Many individuals were exposed to less but the generators of the dust were exposed often to 20 fibers per milliliter or more. If all

such high concentrations had been reduced to less than two fibers per milliliter, 280,000 could have been saved.

In a practical situation, application of an exposure limit would have led to an even lower average exposure (at the site of generation).

I might mention that had there been vigorous application of even the standard proposed in 1938, the so-called 5 million particle per cubic foot standard at least 175,000 fewer asbestos-related deaths would have occurred.

Let me turn to the question of the adequacy of our two fiber standard. One can make estimates of the risks to workers exposed to that standard. These estimates are based upon exposure-response relationships determined in a variety of exposure circumstances. Because of the variability of the exposed relationships a range of risks is provided [table 2].

It is estimated that if a worker were exposed to two fibers per milliliter for a working lifetime, the risk of death would be between 2,700 to 24,000 per 100,000 individuals exposed. That is, in such work circumstances, 2.7 percent to 24 percent of the deaths of workers would be related to the asbestos exposure. The most probable percentage would be about 8 percent. Lower exposure concentrations would lead to a proportionally lower percentage of asbestos-related deaths.

Clearly, a current standard ill-serves the working man or woman.

Let me now address the question of the effects of the two-fiber standard on future mortality from current exposures. That is, what would be the effect on future mortality if a standard much more stringent than two-fibers per milliliter is implemented now or had been implemented earlier, what deaths could have been prevented?

This is difficult to answer because of the limited information available on the current concentrations different groups of workers are exposed to.

As seen in table 1, it is estimated that more than 3 million workers may be exposed to asbestos by virtue of their current jobs in construction and shipbuilding, in building maintenance, and in direct manufacturing trades.

However, most of them are not exposed currently to a concentration of two fibers per milliliter. In the case of garage mechanics and construction workers the average intensity of exposure is certainly less. However, in other trades and other industries, average exposures of one to two fibers may occur and in many circumstances. I am sure they are exceeded.

For purposes of illustration let me assume that 1 million workers are currently exposed to an average of 1 fiber per milliliter. That is to half the current standard.

This will lead to asbestos-related mortality of from 400 to 4,000 deaths for each year the assumed exposure continues. Clearly, a more effective standard should be rapidly promulgated.

Finally, I would like to point out that the establishment of a numerical standard is only one aspect of protecting the workingman and woman from asbestos. Lives will only be saved if there is compliance with established numerical exposure limits and with work

practice specified in a standard. I would emphasize that work practices are an extremely important aspect of any asbestos standard.

In order for effective compliance to be achieved, several conditions must be met. They are: No. 1, employers must be aware of the need for and the requirements of a standard; No. 2, workers must be educated about the effects of asbestos and on effective methods to prevent exposure.

The exposures that are taking place now are largely in structure where asbestos has previously been applied as thermal insulation or as fireproofing, in ships, in factories, in powerplants, in refineries, in chemical plants.

There are now 1 million tons of friable asbestos in place in such facilities. The exposures of the future will be in the maintenance and repair of that now asbestos in place. One of the most important aspect of controlling risks in the future is for effective work practices to be established for maintenance work and for workers to know what they are and to utilize them.

No. 3, engineering controls and work practices must be developed to reduce the exposures to the lowest levels commensurate with existing technology.

No. 4, an effective compliance force must be available to assure that the standard is met.

This is an enormous task. It involves providing guidance to industry and labor, it involves stringent enforcement of improved standards. Clearly these activities will involve considerable manpower and considerable expense. Resources and directors must be provided to OSHA to assure that it is done.

Thank you.

Mr. FRANK. Thank you very much, Dr. Nicholson.

[Dr. Nicholson's prepared statement follows:]

PREPARED STATEMENT OF WILLIAM J. NICHOLSON, PH. D., MOUNT SINAI SCHOOL OF MEDICINE

My name is William J. Nicholson. I am an Associate Professor of Community Medicine and Associate Director of the Environmental Sciences Laboratory of Mount Sinai School of Medicine. Since 1969 my work at Mount Sinai has largely been concerned with quantification of health effects associated with asbestos exposure. In this I have conducted industrial hygiene surveys of asbestos exposed workers, clinical and statistical epidemiological studies identifying disease patterns among individuals exposed to asbestos, and risk estimates of disease from current and past asbestos exposures.

With respect to the latter activity, I have recently published a paper on the projected mortality from exposures to asbestos that occurred between 1940 and 1980 in a variety of trades and occupations. A copy of this paper is provided for the hearing record. The results of the research illustrate the tragic consequences of our past inadequacies in controlling asbestos. From an analysis of exposures in eleven major occupational categories, it is estimated that from 1980 onwards there will be 350,000 additional deaths of asbestos related cancers from exposures that occurred between 1940 and 1980. In addition to the deaths from malignant disease, asbestosis will claim other lives. The toll is even extended by the deaths that are occurring among individuals who simply lived with asbestos workers and people who were exposed in other than occupational circumstances. Table 1 lists the estimated number of deaths by occupation along with recent data on the possible number of individuals exposed to asbestos in these different work activities.

A review of Table 1 demonstrates that most deaths will occur among individuals who were exposed to asbestos fibers released during the installation, repair or removal of thermal insulation materials containing asbestos. Over 70% of the projected mortality can be associated with this use of asbestos. Ironically, a large number of deaths will occur in workers who were exposed simply

by working in the area where insulation application or removal was under way, such as in the hold of a ship during World War II. The asbestos fibers did not respect craft lines. Electricians, carpenters, plumbers and other working near insulators would breathe the dust as well.

I was requested to address the question of what would have been the consequences had our current asbestos standard of 2 f/ml been in force and complied with since 1940. Table 1 lists estimates of the minimum number of deaths that might have been avoided. Overall, at least 280,000 of the 350,000 premature deaths could have been prevented by the vigorous application of the current asbestos standard. The estimate in the third column of Table 1 was made by assuming that exposures in the work activity releasing asbestos fibers were reduced to 2 f/ml. In a practical situation, application of an exposure limit leads to average exposures at least 50% lower, so the saving effect would be much greater than indicated. Parenthetically, if there had even been vigorous application of the standard suggested in 1938, the 5 million particle per cubic foot standard, at least 175,000 fewer asbestos related deaths will occur.

Let me turn to the question of the adequacy of our current 2 fiber standard. Table 2 lists the range of deaths per 100,000 exposed males that might occur in the various exposure circumstances. These estimates are based upon dose response relationships determined in a variety of exposure circumstances and the range of risks reflects the variability of the observed relationships. As can be seen, from 2.7% to 24% of the deaths of workers exposed for a working lifetime to 2 f/ml will be asbestos related. The most probable percentage is about 8%. Lower exposure concentrations would lead to a proportionally lower percentage of asbestos related deaths. Our current standard ill serves the exposed woman or man.

Addressing the question of the current effects of OSHA's 2 f/ml standard on future mortality. This is difficult to answer because of the limited information available on the current concentrations different groups of workers are exposed to.

As seen in Table 1, more than 3 million workers may be exposed to asbestos by virtue of their current job. However most of them are not exposed to an average concentration of 2 fibers/ml. In the case of garage mechanics and construction workers the average intensity of exposure is certainly less. However, in the other trades and industries, average exposures of 1-2 fibers may obtain and in many circumstances even be exceeded, however for purposes of illustration let me assume that 1,000,000 workers are currently exposed to an average of 1 fiber/ml. This will lead to an asbestos related mortality of from 400 to 4000 deaths for each year the assumed exposure continues. Clearly, a more effective standard should be rapidly promulgated.

Finally, I would like to point out that the establishment of a numerical standard is only one aspect of protecting the working man and woman from asbestos. Lives will only be saved if there is compliance with established numerical exposure limits and with work practices specified in a standard. In order for effective compliance to be achieved several conditions must be met. They are:

1. employers must be aware of the need for and the requirements of a standard,
2. workers must be educated about the effects of asbestos and on effective methods to prevent exposure,
3. engineering controls and work practices must be developed to reduce exposures to the lowest levels commensurate with existing technology, and
4. an effective compliance force must be available to assure that the standard is met.

This latter activity would involve providing guidance to industry in methods of compliance and enforcing existing standards where violations occur. Clearly these activities require considerable manpower and resources must be provided to OSHA.

Table 1

The projected mortality from exposures to asbestos, 1940-1980,
and the number of workers potentially exposed, 1983

Industry or occupation	Number of deaths projected from exposures, 1940-1980	Number of deaths prevented by compliance with a 2 f/ml standard	Number of workers potentially exposed, 1983
Primary asbestos manufacturing	17,000	14,700	31,000
Secondary asbestos manufacturing	24,700	18,100	114,000
Insulation work	24,800	21,500	55,000
Shipbuilding and repair	74,000	66,600	177,000
Construction trades	121,200	109,100	1,029,000
Railroad engine repair	3,100	2,700	0
Utility services	11,300	9,100	74,000
Stationary engineers and firemen	31,800	25,400	293,000
Chemical plant & refinery maintenance	16,800	13,400	200,000
Automobile maintenance	23,400	0	1,100,000
Marine engineer room personnel (except US Navy)	2,000	1,600	22,000
Totals	350,100	282,000	3,095,000

Table 2

Estimated asbestos related cancer
mortality from exposure to 2 f/ml

	Cancer mortality/100,000 exposed			
	Lung	Mesothelioma	Other	Total
45 years beginning at age 20	1200 - 14,400	760 - 6840	320 - 2880	2680 - 24,100
1 year beginning at age 20	48 - 428	63 - 566	10 - 86	120 - 1080
1 year beginning at age 40	47 - 423	14 - 128	9 - 85	71 - 635
1 year beginning at age 60	27 - 239	1 - 10	5 - 48	33 - 297

Mr. FRANK. Next, Dr. Settle.

STATEMENT OF RUSSELL F. SETTLE, Ph. D., ASSOCIATE PROFESSOR OF ECONOMICS, UNIVERSITY OF DELAWARE, AND VISITING ASSOCIATE PROFESSOR OF ECONOMICS, THE MAXWELL SCHOOL, SYRACUSE UNIVERSITY

Dr. SETTLE. Thank you, Mr. Chairman.

As part of its exploration into what would have happened had there been an occupational asbestos standard before passage of the Occupational Safety and Health Act, the subcommittee requested that I consider in this testimony the costs and benefits to society of the current asbestos standard as if that standard had been in effect from 1940 to the creation of OSHA in 1970.

Data limitations make this task an extremely difficult one. Precise measurements of all of the social costs and benefits that would have arisen from the imposition of an asbestos standard over this 30-year period cannot be developed from data available currently.

Accordingly, the conclusions expressed here are, of necessity, highly tentative, based more on expert judgment than on hard data.

With respect to assessing on economic grounds, the desirability of the asbestos standard as if it had applied to the 1940 through 1970 period, there are a variety of benefits and costs to consider. The principal economic benefits of an effective asbestos standard for this earlier period are: First, the additional production of goods and services by those who otherwise would have been disabled; second, savings in medical expenditures occasioned by asbestos-induced illnesses and; third, savings in legal expenditures from the thousands of liability suits that have resulted from asbestos-related illnesses.

The principal economic costs of an effective asbestos standard over this earlier period are: First, the cost to private industry of complying with the standard and; second, the costs incurred by

Government as a result of inspections and enforcement efforts resulting from this standard.

In my previous benefit cost study of the current Federal asbestos standard, a study conducted in 1975, I developed quantitative estimates for most of these and other less important economic benefits and costs occasioned by the standard.

Those estimates led me to conclude that, on balance, the cost-benefit analysis favors the current Federal asbestos standard. That is, the evidence suggested that for every dollar of cost society incurred as a result of the Federal asbestos standard, it received in return more than a dollar in benefits.

A best guess places the benefit-cost ratio at about 1.2, implying a \$1.20 in economic benefits for every \$1 in economic costs.

These estimates pertain to economic effects only; of course, had the intangible benefits of avoiding premature illnesses and deaths been quantifiable, the estimated benefit-cost ratio would have been even more favorable.

Now, let us turn to the difficult issue of evaluating the costs and benefits of the current asbestos standard as if it applied to the 1940 through 1970 period.

In the absence of hard data on many of the key economic effects of applying such a standard, what conclusions, if any, can be inferred about the desirability of this hypothetical Governmental intervention?

What are the principal facts known about the asbestos dust hazard during the 1940 through 1970 period?

Clearly, the hazard was an extremely serious one for those workers exposed to it, leading to thousands of illnesses, many of them fatal.

Second, the hazard of exposure to asbestos dust was understood well enough by medical experts so as to provide the appropriate basis for governmental regulation of that hazard.

Third, the extremely long latency periods for the asbestos-induced diseases make it extraordinarily difficult, if not impossible, for workers to draw a close connection between exposure and eventual illness, especially since many of the diseases arise from other causes.

Accordingly, without governmental regulation or widespread concern among workers exposed to the hazard, firms would have had no clear economic incentive to help protect workers against exposure to asbestos dust.

These facts clearly suggest that some form of governmental regulations over occupational exposure to asbestos dust during the 1940 through 1970 would have been desirable on economic grounds.

The only issue at contention is whether the current Federal asbestos standard would have been appropriate for this period.

In the absence of evidence to the contrary, one is inclined to accept the results of my 1975 study as the best, although admittedly crude, indicator of how well the current standard would have fared on economic grounds during this period.

Technological differences between this earlier period and the present could lead to different estimates of the absolute magnitudes of the costs and benefits of an asbestos standard, as it applies to the two different time periods.

However, there is no apparent reason to believe that the relative magnitudes of the costs and benefits would differ.

Accordingly, I would conclude that the best available evidence indicates that on economic grounds the current Federal asbestos standard should have been imposed some 30 years earlier than it actually was.

Mr. FRANK. Thank you.

[Dr. Settle's prepared statement follows:]

Benefits and Costs of Applying the Current Federal Standard on
Occupational Exposure to Asbestos Dust to the 1940-1970 Period

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and

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*Testimony before the Manpower and Housing Subcommittee of the House
Committee on Government Operations, Washington, DC, June 28, 1983.

As part of its exploration into what would have happened had there been an occupational asbestos standard before passage of the Occupational Safety and Health Act, the subcommittee requested that I consider in this testimony the costs and benefits to society of the current asbestos standard as if the standard had been in effect from 1940 to the creation of OSHA in 1970.

Data limitations make this task an extremely difficult one. Precise measurements of the social costs and benefits that would have arisen from the imposition of an asbestos standard over this 30 year period cannot be developed from data available currently. Accordingly, the conclusions reached in this paper are, of necessity, highly tentative, based more on "expert" judgment than on "hard" data.

My credentials relevant to the issue at hand are as follows. One of my areas of expertise is cost-benefit analysis, especially as it applies to federal regulations. Among other things, I have co-authored a textbook on cost-benefit analysis, and have served as staff economist for a National Academy of Sciences investigation of the cost-benefit methodology employed by the Environmental Protection Agency for evaluating proposed pesticide regulations. Moreover, as part of my Ph.D. dissertation, I developed quantitative estimates of the social benefits and costs of the current federal asbestos standard. Under commission from the U.S. Department of Labor, I recast this dissertation work (into a paper titled "Benefits and Costs of the Federal Asbestos Standard") for presentation at a 1975 DOL-sponsored conference on occupational safety and health regulations; a version of this cost-benefit study was also invited for presentation at the annual meetings of the American Economic Association.

Before turning to the specific issue of the costs and benefits of an asbestos standard for the 1940-1970 period, a few general remarks about the economic advantages and disadvantages of government regulations may be useful. All government regulations impose economic costs on society. However, they also all confer economic benefits on society. Accordingly, whether any specific regulation is desirable, on economic grounds, depends on whether the benefits of the regulation outweigh the costs. The determination of the relative magnitudes of the economic costs and benefits is, fundamentally, an empirical or measurement problem, not a problem susceptible to resolution by appeal to philosophical, legal, or political positions.

With respect to assessing, on economic grounds, the desirability of the asbestos standard as if it applied to the 1940-1970 period, there are a variety of benefits and costs to consider. The principal economic benefits of an effective asbestos standard for this earlier period are: (1) the additional production of goods and services by those who otherwise would have been disabled; (2) savings in medical expenditures occasioned by asbestos-induced illnesses; and (3) savings in legal expenditures from the thousands of product liability suits that have resulted from asbestos-related illnesses. The principal economic costs of an effective asbestos standard over this earlier period are: (1) the costs of complying with the standard; and (2) the inspection and enforcement costs associated with the standard.

In my previous study of the current federal asbestos standard, I developed quantitative estimates for most of these (and other less important) economic benefits and costs occasioned by the standard. Those

estimates led me to conclude that, on balance, the cost-benefit analysis favors the current federal asbestos standard. That is, the evidence suggested that, for every dollar of cost society incurred as a result of the federal asbestos standard, it received in return more than a dollar in benefits. A "best guess" places the benefit-cost ratio at about 1.2, implying a \$1.20 in economic benefits for every \$1.00 in economic costs. These estimates pertain to economic effects only; of course, had the intangible benefits of avoiding premature illnesses and deaths been quantifiable, the estimated benefit-cost ratio would have been even more favorable.

Now, let us turn to the difficult issue of evaluating the costs and benefits of the current asbestos standard as if it applied to the 1940-1970 period. In the absence of "hard" data on many of the key economic effects of applying such a standard, what conclusions, if any, can be inferred about the desirability of this hypothetical governmental intervention?

What are the principal facts known about the asbestos dust hazard during the 1940-1970 period? Clearly, the hazard was an extremely serious one for those workers exposed to it, leading to thousands of illnesses, many of them terminal. Secondly, the hazard of exposure to asbestos dust was understood well enough by medical experts so as to provide the appropriate basis for governmental regulation of that hazard. Third, the extremely long latency periods for the asbestos-induced diseases make it extraordinarily difficult, if not impossible, for workers to draw a close connection between exposure and eventual illness, especially since many of the diseases (e.g. lung cancer)

arise from other causes (e.g., smoking). Accordingly, without governmental regulation or widespread concern among workers exposed to the hazard, firms would have had no clear economic incentive to help protect workers against exposure to asbestos dust. These facts clearly suggest that some form of governmental regulations over occupational exposure to asbestos dust during the 1940-1970 period would have been desirable on economic grounds.

The only issue at contention is whether the current federal asbestos standard would have been appropriate for the 1940-1970 period. In the absence of evidence to the contrary, one is inclined to accept the results of my 1975 study as the best--although admittedly crude--indicator of how well the current standard would have fared, on economic grounds, over the 1940-1970 period. Technological differences between this earlier period and the present could lead to different estimates of the absolute magnitudes of the costs and benefits of an asbestos standard, as it applies to the two different time periods. However, there is no apparent reason to believe that the relative magnitudes of the costs and benefits would differ between these two time periods.

Accordingly, I would conclude that the best available evidence indicates that, on economic grounds, the current federal asbestos standard should have been imposed 30 years earlier than it actually was.

Mr. FRANK. We will begin, with Dr. Nicholson. First, I want to make sure I get what seems to be one of the central points.

Let me say, first of all, I appreciate both of you gentlemen joining us and engaging in this kind of speculation. I realize that attempting to project backward what would have been the effect of a standard isn't going to yield the hardest data. On the other hand, those of us who have just been engaged in the congressional budget process and in estimates of the deficit are used to data of a certain degree of softness so we welcome you to that status.

But it is important, it seems to me, because of the effort to quantify—and I should make clear my own bias in this—the costs of regulation has been used as an antiregulation tool. And while it is legitimate for us to know the costs it is also important that we attempt to quantify the benefits of regulation and the costs of not regulating so that judgment is made in a reasonable way.

Dr. Nicholson, I was struck by your argument that as best as you can tell, given the inherent weaknesses of this kind of method of projecting backward, that approximately 280,000 would not have died from asbestos-related causes if we had had a 2-fiber standard in effect in 1940? How best to phrase that?

Dr. NICHOLSON. The number that I gave you, the 350,000, is the projected mortality from exposures that took place in that period of time. Those deaths have not yet come about and they are going to come about. And that speaks clearly for the need for some mechanism of intervention separate from—

Mr. FRANK. There are 350,000 people now alive who will tragically, and statistically, die because of exposure to asbestos; 280,000 of those deaths from asbestos would have been avoided had we imposed that standard 40 years ago.

Dr. NICHOLSON. That is the estimate, yes.

Mr. FRANK. And the great majority of those deaths could have been avoided and all the costs that are there.

You said that in 1938, someone, parenthetically, if there had been vigorous application of the standard suggested in 1938, 5 million particles per cubic feet, we would have been able to avoid half the deaths that we can now anticipate.

Who suggested that standard in 1938?

Dr. NICHOLSON. In the period just prior to 1938, there was a study of the U.S. Public Health Service of four textile plants in North Carolina that looked at the presence of asbestosis among the workers that they were able to examine.

Although the study was limited by the circumstances, they found that there was not a significant increase in asbestotic signs in those that were exposed to a concentration less than 5 million particles per cubic foot.

It was suggested by the Public Health Service that maintenance of that level of dust in a workplace would probably protect against asbestosis. However, it was a tentative conclusion.

Had such a standard been applied to the workplaces where thermal insulation was used after 1938 the mortality that I described would have been avoided.

Mr. FRANK. Have you any idea why it wasn't adopted?

Mr. NICHOLSON. It did not have the force of law. It was adopted by a private organization, the American Conference of Governmen-

tal Industrial Hygienists, and published as a recommended threshold limit value for asbestos dust from 1945 onward.

It finally did have force of law in the early 1960's when the ACGIH TLV's were incorporated into the Walsh-Healey Act for those industries doing more than \$10,000 of business with the Federal Government. Unfortunately, there was no enforcement of these standards. There wasn't the manpower to educate the workers, to educate the employers as to the need for compliance or to inspect the workplaces. And, thus, the ACGIH TLV's simply served as recommendations, which may or may not have been followed in the different workplaces.

Mr. FRANK. That was my next point.

You put a lot of emphasis, when you talk about what we have to do for the future and you do it again now, in saying that simply having the standard isn't enough. Is there nothing self-enforcing about them?

One of the things we are told is that industry is often beset by hordes of inspectors—and inspectors seem to travel in hordes, they don't come in groups, and they go out and bother people by inspecting them. We have been told that really is unnecessary.

Are you suggesting that since it has already been put in place, that there is no cheap way to enforce the standard?

Dr. NICHOLSON. I don't think there is a cheap way to do it. Many industries, indeed, are complying with the existing standard, they are doing the best they can. These are usually the larger industries that have a skilled engineering force and an in-place industrial hygiene staff that can work toward a safe workplace in their plants.

However, most of the asbestos is in place when there is only one or two people that may be exposed. It is in buildings, it is in schools, it is in a lot of little, tiny plants that do not have the capability, or the knowledge, for self-enforcement.

Mr. FRANK. That is an interesting point because often we are told that what we should do is to exempt smaller businesses from regulation. And what you are suggesting, I gather, is that at least with regard to asbestos and protecting the health of the workers and avoiding the economic costs and further illness and injury from asbestos, that it would not be sensible to exempt the smaller ones and go after the bigger ones. The problem of enforcement is likely to be because of the prevalence of this stuff in places where people work. What you are saying is that 70 percent of the deaths occurred from people who were not in what we would think of as the asbestos industry? That 70 percent of the projected mortality is associated with the repair or removal of thermal insulation.

Dr. NICHOLSON. And the vast majority—

Mr. FRANK. And the vast majority would be 70 percent, I'm sorry.

Dr. NICHOLSON [continuing]. Would be people that were just, in essence, bystanders.

Mr. FRANK. So a very large percentage, maybe not more than half, are people who were in the construction trades, or in shipbuilding, and which makes it all the more important, is that we have an adequate corps of inspectors.

Dr. NICHOLSON. And an adequate education program so that these diverse workers—diverse in the sense that they are not orga-

nized in a nice group—can learn of the hazards and of the proper procedures to take.

Mr. FRANK. But it is important that the workers themselves understand what the problems are, what to look for, what to avoid, and how to deal with it.

One last question Dr. Nicholson. In your testimony you talk about the need for effective compliance, engineering controls, and education of workers, since we have made the mistake of not regulating isn't it more expensive to undo than it would have been to avoid it in the first place?

I gather that a large part of the problem we face is that because people did not stop it at the beginning, we now have this serious health problem all over the place and that causes us a great deal of difficulty in trying to protect ourselves.

Dr. NICHOLSON. Yes, indeed, that is certainly true. In fact, the cost of reducing this toll would have been relatively little because, as I pointed out, 70 percent of the mortality had its source from the use of one particular type of product. That product now has been changed such as there is no asbestos in it and the cost of doing so was relatively limited.

To have done that earlier, would have been a great benefit.

Mr. FRANK. Were the substitutable materials available at an early period, or is this something new?

Dr. NICHOLSON. To a large extent, yes. They had fibrous glass available which could have been used.

Mr. FRANK. Failing to adopt a strict standard and impose it in the first place has made it a problem? When we were too lax at the beginning, we now have this pervasive problem all over the place. The cost of undoing of regulatory lapse is a very serious one.

Dr. NICHOLSON. Yes, that's right. I am reminded of the story of a corseteer in New York who observed that some things are more difficult to get out of than to get into.

Mr. FRANK. All right.

Dr. Settle, one thing in particular which struck me in your testimony, we are told one of the arguments for deregulating is that Government should not do what the private sector can do for itself and do better.

I think one of the confusions that exist is that we call two very different things deregulation. Or maybe we call two very different things regulation so we call them then deregulation.

One is an attempt by Government to replace those functions that the market is supposed to perform, setting airline ticket prices, or deciding where trucks ought to go.

There is an arguable case there that the market is supposed to allocate these offices and fix prices so that Government intervention in that regard is one set of phenomena. We are talking here about another where, if I understand your testimony, in a perfectly functioning market this wouldn't be taken care of.

What you say at the beginning of page 3 is that because of the long latency periods there is no close connection from the standpoint of any individual employee between the costs of exposure to asbestos and problems that he or she is going to have. So that absent Government regulation, what you are saying is that firms have no clear economic incentive to help protect workers against

exposure. Now, that doesn't mean that they are wantonly cruel and that they want to expose people.

What it does mean, unlike the areas of economic regulation where the Government is involved in some kind of price fixing, and there is arguably a private sector mechanism that will do it as well or better. I gather you are saying here there is no private sector mechanism. There is nothing absent some Government action that gives the private firm any incentive whatsoever from the economic standpoint, leaving aside the humanitarian.

But from the economic standpoint, there is no incentive to be concerned about asbestos given the nature of the problems it has caused.

Dr. SETTLE. That is exactly right. In these areas involving occupational health hazards, particularly those with long latency periods, you would have to believe that the individual workers confronting such hazards fully understood them and behaved in an optimal way when they were around them. It takes tremendous faith in the workings of the free marketplace to believe in that particular assumption.

So this is an area where the market will generally fail to operate properly without some form of governmental regulation.

Mr. FRANK. So regulation here is not an attempt to displace the market. It is not a case of the Government saying, we know better than the private sector on how to deal with this. It is a case of society saying, this is a goal that simply will not be accomplished unless it is accomplished this way. It is not a substitution of one for another. It is a function that is not going to be there.

In other words, being a private manufacturer since 1940, 1950, I would not see any costs to the use of asbestos in my operation?

Dr. SETTLE. That is right.

Mr. FRANK. I take it the long latency means that even my insurance isn't going to be affected. I mean, nobody is going to raise my premiums at that point because it hasn't happened.

Dr. SETTLE. Yes; especially since many of these diseases are caused by other factors such as smoking. It is extraordinarily difficult to pin down the particular source of a disease even though it realistically was caused by exposure to asbestos. For legal purposes it is just very difficult to do.

Mr. FRANK. Your basic conclusion, leaving aside humanitarian concerns et cetera, should be on a dollars and cents basis. We paid a price because there was no Government agency that stepped in and said this is a dangerous substance and don't use it. I mean, in dollars and cents it cost us more than the efficiency of using it.

Dr. SETTLE. That is precisely right. That is the bottom line of this analysis.

Mr. FRANK. Even if one has respect for the free market and the way it operates there are social costs that will come in the best functioning situation and that can only be avoided if there is some Government action that says you are going to have to stop this because it is going to cost us more.

Dr. SETTLE. Yes; for the free market to operate properly, the participants in those markets have to have very good information and this is clearly a case where that information simply wasn't at the disposal of the workers.

Mr. FRANK. That's right, and from the standpoint of the manufacturer, even if the information, again, setting aside humanitarian concerns which may or may not exist. There are people who have said, for instance, that recently one respected figure just said there is no such thing as a dangerous substance. It was the President of the United States who said there is no such thing as a dangerous substance, and there are only amounts that are dangerous.

A manufacturer who might have believed that, might then have said, look, I am going to follow the law and there is no law against using this stuff and this is the cheapest and most efficient way for me to use it, that would have been a socially approved form of behavior and there would have been no concern for the cost whatsoever.

Dr. SETTLE. Absolutely. For the manufacturers to have had some concern, they would either have had to conform to Government regulations over the use of this substance or they would have had to be in the position of paying workers a risk premium for working around it.

Since asbestos workers in general were not responsive to the hazard that was confronting them, the manufacturers would have had no reason, on economic grounds, to act to reduce that hazard.

Mr. FRANK. The only way the market could have done it would have been if we had somehow gotten word to the workers that they were going to be incurring this problem and then presumably they would have demanded a higher wage to work there.

Dr. SETTLE. Not only would we need to have gotten word to them but we would also need to have them understand and believe in what we were saying.

Mr. FRANK. In the thirties, I doubt whether that would have been a serious disincentive for people to take what few jobs were there.

Gentlemen, I thank you both. Without objection, the paper by Dr. Nicholson, Mr. Perkel, and Dr. Selikoff; and "Benefit Costs to the Federal Asbestos Standards" by Dr. Settle, will be submitted for the record.

Thank you very much, gentlemen.

Dr. NICHOLSON. Thank you.

[The documents follow:]

Occupational Exposure to Asbestos: Population at Risk and Projected Mortality — 1980-2030

William J. Nicholson, PhD, George Perkel, MA, and Irving J. Selikoff, MD

Estimates have been made of the numbers of cancers that are projected to result from past exposures to asbestos in a number of occupations and industries. From 1940 through 1979, 27,500,000 individuals had potential asbestos exposure at work. Of these, 18,800,000 had exposure in excess of that equivalent to two months employment in primary manufacturing or as an insulator ($> 2-3$ f-yr/ml). 21,000,000 of the 27,500,000 and 14,100,000 of the 18,800,000 are estimated to have been alive on January 1, 1980.

It is further estimated that approximately 8,200 asbestos-related cancer deaths are now occurring annually. This will rise to about 9,700 annually by the year 2000. Thereafter, the mortality rate from past exposure will decrease, but still remain substantial for another three decades.

Key words: asbestos, occupational exposure, risk assessment, morality projections

INTRODUCTION

A large volume of research has been conducted on the adverse health effects of exposure to asbestos. However, relatively little is known about the magnitude of the population at risk to asbestos-related disease. A number of occupations and industries have been identified as involving substantial occupational exposure to asbestos, but no detailed evaluation has been made to quantify the number of persons whose employment experience has resulted in sufficient exposure to warrant characterizing them as at risk. This analysis is designed to provide an assessment of the extent and consequences of occupational asbestos exposure in the United States between 1940 and 1979.

The task of estimating the population at risk to asbestos-related disease is complicated by a number of factors:

Environmental Sciences Laboratory, Mount Sinai School of Medicine (CUNY), New York.

The analysis was prepared as part of a study for the US Department of Labor entitled "Disability Compensation for Asbestos-Associated Disease in the United States," June 1982.

Address reprint requests to Dr. William J. Nicholson, Environmental Sciences Laboratory, Mount Sinai School of Medicine (CUNY), One Gustave Levy Place, New York, NY 10029.

Accepted for publication July 23, 1982.

1. The precise number of persons occupationally exposed to asbestos at any given time is not known.
2. The level of exposure to asbestos necessary to increase the risk of incurring asbestos-related disease is only imperfectly known, estimates being complicated by the varying interactions of the two elements that go into "dose" (time and intensity).
3. The extent to which workers have changed occupations and/or industries from time to time so as to place them at risk to asbestos-related diseases (or to end such exposure) at any time in the past four decades is not known.

We have sought to overcome these obstacles by compiling the best available data concerning worker exposure to asbestos and the turnover of workers in the occupations and industries involved. The sources and methods used to estimate the population at risk are set forth below.

MATERIALS AND METHODS

Identification of Industries and Occupations at Risk

Workers are exposed to asbestos in a wide variety of industrial pursuits from mining and milling to primary manufacturing (producing manufactured goods from raw asbestos fibers) to secondary manufacturing (processing asbestos manufactured products to make other products) to consumer industries (utilizing a finished product containing asbestos without modification) [Daly et al, 1976].

Mining and milling. Fewer than 600 persons in the United States are employed in mining and milling asbestos [Meylan, 1978]. In view of the small number involved and the lack of information on employee turnover, we have excluded this industry from our estimates.

Primary manufacturing. The Asbestos Information Association has estimated that there are upwards of 3,000 discrete uses of asbestos. A selection of major asbestos products and their uses is presented in Table 1. The primary manufacturing industries in which asbestos products are produced and which involve substantial asbestos exposure to production and maintenance employees are as follows:

Asbestos products industry (SIC 3292). The major products of this industry are friction products, asbestos-cement pipe and sheet, asbestos textiles, floor tiles, roofing felts, insulating materials, and other asbestos building materials.

Extensive data indicate that excessive fiber concentrations existed in the production of asbestos products during previous years. In a study of retirees from one of the largest asbestos products manufacturers, Henderson and Enterline [1979] categorized work exposures according to total dust concentration (as measured by a midjet impinger) times period of employment. Using recently obtained data on the conversion between such particle counts and fiber concentrations, it is estimated that the average concentration to which the members of his cohort were exposed was 30 fibers/ml [Asbestos Information Association, 1979]. Similar concentrations were suggested for the work force exposure in a large United States asbestos products manufacturer studied by Nicholson et al [in press]. Here subjective data, consistent with company measurements of dust concentrations, suggested that the person-weighted average exposure was approximately 25 fibers/ml between 1945 and 1965. In two asbestos insulation manufacturing facilities in Port Allegany, Pennsylvania, and Tyler, Texas, aver-

TABLE I. Selected Asbestos Products and Their End Uses*

Floor tile	Gaskets and packings	Friction products	Paints, coatings and sealants	Asbestos-reinforced plastics	Asbestos cement pipe
Office floors	Valve components	Clutch/transmission components	Automotive/truck body coatings	Electric motor components	Chemical process piping
Commercial floors	Flange components	Brake components	Roof coatings and patching compounds	Molded product compounds for high-strength/weight uses	Water supply piping
Residence floors	Pump components	Industrial friction materials			Conduits for electric wires
	Tank sealing components				
Asbestos textiles					
Packing components					Asbestos cement sheet
Gasket components			Asbestos paper		
Roofing materials		Gas vapor ducts for corrosive compounds			
Commercial/industrial dryer felts		Fireproof absorbent papers			Hoods, vents for corrosive chemicals
Heat/fire protective clothing		Table pads and heat protective mats			Chemical tanks and vessel manufacturing
Clutch/transmission components		Heat/fire protection components			Portable construction buildings
Electrical wire and pipe insulation		Molten glass handling equipment			Electrical switchboards and components
Theater curtains and fireproof draperies		Insulation products			Residential building materials
		Gasket components			Molten metal handling equipment
		Underlayment for sheet flooring			Industrial building materials
		Electric wire insulation			Fire protection
		Filters for beverages			Insulation products
		Appliance insulation			Small appliance components
		Roofing materials			Electric motor components
					Laboratory furniture
					Cooling tower components

*Source: Daly et al, 1976.

age concentrations of 35 fibers/ml were measured by NIOSH between 1968 and 1971 [National Institute for Occupational Safety and Health, 1972].

These concentrations were characteristic of early exposure levels in manufacturing industries. In recent years, considerable efforts have been made to reduce fiber concentrations. During 1975, air levels of from 0.5 to 4.0 f/ml were found to characterize most primary manufacturing processes (see below). With appropriate engineering, even asbestos textile manufacturing can be controlled to levels below 1.5 f/ml [Lewinsohn et al, 1979].

Since substantial asbestos exposure is involved in all production and maintenance operations in this industry, we have included all production and maintenance workers in our estimates of the population at risk.

Gaskets, packing and sealing devices industry (SIC 3293). This industry encompasses products made of asbestos, leather, metal, and rubber. Prior to 1972, asbestos was the predominant raw material used. A change in the industry classification system in 1972 expanded the definition of this industry to include products made of leather, metal, and rubber [Office of Management and Budget, 1972]. Since approximately one half of the employees of the newly defined industry were employed in plants manufacturing asbestos products, we have included one half of the production and maintenance employees since 1972 in our estimates of the population at risk. For years prior to 1972, we counted all employees in the at-risk group.

Building paper and building board mills (SIC 2661). This industry covers the production of asbestos paper, asbestos board, and sheeting and various types of papers and insulating boards used in building construction. Since approximately one half of the employees in 1972 were employed in construction paper plants (where asbestos was the principal raw material), we have included one half of the production and maintenance employees in our estimates of the population at risk.

Recent (1975) fiber concentrations measured in the primary asbestos manufacturing industry have been reported in the Asbestos Information Association-Weston submission to OSHA as a response to the October 1975 proposed revision to the asbestos standard [Daly et al, 1976]. These data indicate the following asbestos concentrations were present in the respective industry segments:

Primary industry	1975 asbestos fiber concentrations (f/ml)	
	Range	"Typical"
Asbestos paper	0.10- 2.8	0.75-1.9
Asbestos cement pipe	0.25- 4.5	0.50-2.2
Floor tile	0.25- 4.3	0.50-1.75
Friction products	0.10-22.0	1.00-3.3
Paints, coatings, and sealants	0.25- 8.0	1.00-2.5
Asbestos cement sheet	0.25- 8.7	1.00-3.0
Gaskets and packing	0.10- 2.5	—
Reinforced plastics	0.20- 3.0	0.75-2.0
Asbestos textiles	0.25-15.0	1.00-4.0

Secondary manufacturing. Secondary industries are those that receive products containing asbestos and further process, modify, or fabricate them to produce other intermediate or final products. The following industries involve such processes:

Heating equipment except electric and warm air furnaces (SIC 3433). This industry is engaged in the production of heating boilers; domestic furnaces and gas burners; and oil burners, space, and wall heaters, all of which tended to incorporate asbestos insulation in their construction. We have included one half of the production and maintenance employees in our estimates of the population at risk.

Fabricated plate workers (Boiler Shops) (SIC 3443). Establishments in this industry are engaged in manufacturing power and marine boilers, pressure and non-pressure tanks, processing and storage tanks, and heat exchangers and similar products, many of which include asbestos insulation. The subdivisions of this industry that utilize extensive asbestos insulation (heat exchangers and steam condensers; steel power boilers, parts and attachments; and nuclear reactor steam supply systems) accounted for approximately one half of the industry's total production workers in 1977. We have included one half of the production and maintenance employees in our estimates of the population at risk.

Industrial process furnaces and ovens (SIC 3567). This industry produces industrial process furnaces, ovens, induction and dielectric heating equipment, and related devices. All of the subdivisions make extensive use of asbestos insulation and all of the production and maintenance employees are included in our population at risk estimates.

Electric housewares and fans (SIC 3634). Establishments in this industry are engaged in manufacturing electric housewares for heating, cooking, and other purposes and electric fans. We estimate that 10% of the production and maintenance employees are at risk of asbestos-related disease.

Asbestos is used in a variety of other secondary industries. These include friction products, reinforced plastics, products containing asbestos paper, various industries manufacturing laboratory equipment, electrical switchboards, cooling tower components, fire protection materials, etc. It is impossible to extract the number of individuals in all secondary manufacturing from BLS data. The only published information is that from the Weston analysis done in cooperation with the asbestos industry [Daly et al, 1976]. They report the following 1975 employment data for secondary manufacturing industries, categorized by the primary source of asbestos:

Primary source of asbestos materials	Number of exposed employees
Asbestos paper	158,400
Friction products	27,600
Asbestos cement sheets	19,200
Gaskets and packings	12,000
Reinforced plastics	8,400
Asbestos textiles	6,000
Miscellaneous	8,400
Total	240,000

By comparison, our estimate of the asbestos-exposed employment during 1975 for the four industries listed previously (SIC 3433, 3443, 3567, and 3634) totaled 38,000. Moreover, only employees of companies manufacturing electric housewares and fans would appear to have been included in the Weston tabulations. However, it is difficult to be certain that their classification of primary and secondary is similar to ours. In their classification, they estimate 23,000 to be exposed in primary manufacturing in 1975 versus our estimate of 31,000.

Thus, some of our primary industry may be their secondary. It is difficult to estimate the exposures the individuals identified by Weston would have had. Some data are presented on current asbestos concentrations (see below). It is unlikely, however, that 158,000 employees would have had significant exposures during the manufacture of products containing asbestos paper. The data in the other manufacturing segments appear reasonable, however. To account for all these exposures, we will consider that a number equal to twice the four groups specified by SIC numbers are additionally exposed in secondary manufacturing. (This additional number totals 76,000 in 1975.)

Data provided by Asbestos Information Association-Weston on fiber counts in secondary manufacturing are:

Secondary industry ^a	Asbestos fiber concentration range reported (f/ml)
Asbestos paper	1.0-3.5
Friction products ^b	2.5-6.5
Asbestos cement sheet	1.0-6.0
Gasket and packing	0.2-5.0
Asbestos-reinforced plastic	0.5-2.0
Asbestos textiles	0.5-5.0

^aCategorized by primary source of asbestos material.

^bDoes not include brake and clutch maintenance.

No information is available on dust counts in these industries in earlier years.

Shipbuilding and repair (SIC 3731). The risk of asbestos-related disease among shipyard workers was emphasized in 1968 by Harries, who reported five cases of pleural mesothelioma among employees of the Royal Navy Dockyard in Devonport [Harries, 1968]. His findings were noteworthy in that none of the patients was an "asbestos worker." They were employed in other trades (boilermaker, shipwright, laborer, welder, fitter) and worked in shipyards with asbestos workers but did not themselves often use asbestos. In addition, cases of asbestosis were noted. Stumphius described similar findings in the Netherlands [Stumphius, 1968]. Again, the mesotheliomas were among workers other than those in the usual asbestos trades. Since these initial communications, experiences have been detailed in many parts of the world identifying characteristic asbestos-associated disease among former shipyard workers, including pleural mesothelioma, peritoneal mesothelioma, asbestosis, and lung cancer. Evidence of asbestos-associated disease has been reported among workers employed in United States shipyards during and after World War II [Department of Health, Education, and Welfare, 1981; Felton, 1979; Selikoff, 1965]. These findings indicate that the nature of shipyard work during this period provided significant opportunity for exposure to asbestos of the many trades employed, even though such exposure might have been only intermittent or indirect.

We have included all production and maintenance employees of private and naval shipyards in our estimates of the population at risk. The estimates for naval shipyards, however, are taken from the United States Department of the Navy [Nunneley, Department of the Navy (Personal Communication, 1980)].

Construction. The construction industry accounts for an estimated 70%-80% of total United States consumption of asbestos fiber [Levine, 1978]. Substantial direct exposure to asbestos occurs in the following subdivisions:

1. General contractors—residential buildings other than single family (SIC 1522).
2. General building contractors—nonresidential buildings (SIC 154).
3. Water, sewer, pipe line, communication, and power line construction (SIC 1623).
4. Construction—special trade contractors (SIC 17, except 1771 [concrete work], 1781 [water well drilling], 1791 [structural steel erection], 1794 [excavating and foundation work], 1796 [installation or erection of building equipment, not elsewhere classified]).

Among the asbestos products involved in direct exposures in construction work are asbestos-cement pipe installation; asbestos-cement sheet installation; architectural panel installation; built-up roofing installation; drywall removal, replacement, and installation; removing of roofing felts; asbestos insulation of pipe, tubing, heating units, and electric power generation equipment; paints, coatings, and sealants. In addition to the direct exposure resulting from the use of the above products, construction workers have been subject to considerable indirect exposure to asbestos as a result of the practice of spraying asbestos insulation in multistoried structures during the period 1958-1972. An investigation of the spraying of mineral fiber insulation material in New York City collected on-site samples taken at various distances from the spraying nozzle. It showed fiber counts ranging from 70 f/ml 10 feet from the nozzle to 3 f/ml 25 feet away [Reitze et al, 1972]. Workers in occupations not directly involved in spraying (carpenters, electricians, pipefitters, plumbers, welders, and others) who were on construction sites during or after such spraying are at risk to asbestos-associated disease.

We have included all construction workers in SIC 1522 and 154 in our estimates of the population at risk and the following proportions of the workers in other construction subdivisions:

SIC 1623. Thirty percent of the water distribution pipe sold in the United States in 1974 was asbestos cement [Meylan et al, 1978]. We assumed that this proportion of the workers in the water, sewer, etc, line construction industry is exposed to asbestos from asbestos-cement pipe. In addition, we included maintenance mechanics and helpers employed in SIC 16 (construction other than building construction) to reflect the fact that these workers are exposed to asbestos during the repair of brakes on heavy construction equipment [Hill, 1980]. These workers comprise approximately 5% of the total number of construction workers in SIC 16 [Bureau of Labor Statistics, unpublished].

SIC 17. We have included all construction workers in 171 (plumbing, heating [except electrical], and air conditioning) and SIC 172 (painting, paperhanging, and decorating) in our estimates of the population at risk. The former group has extensive exposure to asbestos in pipe covering and insulation for heating and ventilation equip-

ment. A mortality study of the members of the union of plumbers and pipefitters in the United States noted their potential exposures to asbestos and found significant excesses in proportional mortality ratios for malignant neoplasms of the esophagus, respiratory system, lung, bronchus, and trachea, and "other sites." [Kaminski et al, 1980]. Seven deaths were due to mesothelioma, a clear indicator of asbestos-associated disease.

The latter group (painting, paperhanging, and decorating) has been exposed to many asbestos-containing materials, including spackle compounds used by general painters, taping and joint compounds used in drywall construction, and additions of asbestos to sealant compounds or surfacing materials. Moreover, these workers have indirect exposure to asbestos materials used by other trades in the construction industry. A study of drywall taping workers employed in the New York metropolitan area found mean asbestos fiber concentrations ranging from 5.3 f/ml in hand-sanding to 47.2 f/ml in dry mixing operations [Fischbein et al, 1979]. Other researchers report mean fiber concentrations of from 0.9 to 19.6 f/ml during various activities of drywall taping [Verma and Middleton, 1980]. In addition to the tapers and painters directly engaged in these operations, members of all the construction trades working in the vicinity of ongoing drywall construction were significantly exposed. Mean fiber concentrations varying from 2.3 to 8.6 f/ml were observed at distances from 3 to 20 feet from the taping operation in the same room. In adjacent rooms, background mean fiber levels varied from 2.6 to 4.8 f/ml at distances from 15 to 25 feet from the taping operations.

For the remaining groups covered by SIC 17 (except the five groups identified under 4 above as not being substantially exposed), we have estimated that the proportion of the construction workers at risk during 1958-1972 was 50% (when multi-storied buildings were sprayed with asbestos fireproofing material) and 20% during 1940-1957 and 1973-1979. The following proportions of these groups were found to be exposed to asbestos in the National Occupational Hazard Survey [National Institute for Occupational Safety and Health, unpublished]:

SIC code	SIC description	% Employees exposed to asbestos
173	Electrical work	15
174	Masonry, stonework, tilesetting, and plastering	27
175	Carpentering and flooring	15
176	Roofing and sheetmetal work	41
1793	Glass and glazing work	40
1795	Wrecking and demolition work	NR
1799	Special trade contractors, not elsewhere classified	23

NR, Not reported.

It should be noted that the above percentages understate the proportions of "construction workers" exposed to asbestos in these industries since they are based on the total employment reported rather than total construction workers; the latter concept excludes executive and managerial personnel, professional and technical employees, and routine office workers [Bureau of Labor Statistics, 1976].

Electric, gas, and combination utility services (SIC 491, 492, 493). Power generating facilities have many work areas with elevated temperatures, which have been insulated with asbestos-containing materials, including preformed blocks of hydrous calcium silicate insulation reinforced with asbestos fibers. Other insulation used in this industry consists of asbestos boards, blankets, felts, cloths, tapes, sleeves, and cements that contained various quantities of asbestos [Fontaine and Trayer, 1975]. Studies conducted in England [Bonnell et al, 1975] and France [Fontaine and Trayer, 1975] have found substantial evidence of asbestos-associated disease among persons engaged in maintenance work at power stations, including persons not directly involved in applying or removing insulation materials. We have included one quarter of the "physical workers" employed in electric and gas utilities in our estimate of the population at risk: 10% representing maintenance workers and 15% other persons in the area who are indirectly exposed [H. Jones, 1980].

Occupational groups. The industrial activities for which employment statistics are gathered do not correlate closely with those in which there is occupational contact with asbestos. It has been necessary, therefore, to supplement the estimates derived from the above analysis of industrial employment statistics with estimates of the number of persons employed in particular occupations (crossing industry lines) where significant asbestos exposure has occurred. We have reduced the industry estimates of persons at risk by the numbers employed in the selected occupations to avoid double-counting. The following occupational groups were defined as at risk:

Asbestos and insulation workers. A strikingly increased death rate of lung and other cancers has been observed among a group of asbestos and insulation workers [Selikoff et al, 1979]. All such individuals have significant risk.

Data are available from three research groups on average fiber concentrations in insulation work prior to 1970, when the techniques of application and control measures used were typical of the industry during previous years [Balzer and Cooper, 1968; Ferris et al, 1971; Murphy et al, 1971; Nicholson, 1975]. The data are presented in terms of time (and job-weighted) average concentrations. During certain operations (cement mixing, hand- or band-saw cutting, removal), extremely high concentrations were observed (up to 100 f/ml). However, these operations constituted only a small fraction of the insulators' work activity. Data were also estimated for earlier years when the asbestos content of insulation was twice that of 1965-1970.

Summary of Average Asbestos Air Concentrations During Insulation Work

Research group	Average fiber concentration (f/ml)	
	Light and heavy construction	Marine work
Average concentrations of fibers longer than five micrometers evaluated by membrane filter techniques and phase-contrast microscopy		
Reitze-Nicholson, Mount Sinai [Nicholson, 1975]	6.3	
Balzer-Cooper, U. of Calif. [Balzer and Cooper, 1968]	2.7	6.6
Burgess-Lynch, Harvard [Ferris et al, 1971]		2.9

Average concentrations of all visible fibers counted
with a konimeter and bright-field microscopy

Murphy, Harvard [Murphy et al, 1971]	8.0
Fleischer, US Navy [Fleisher et al, 1946]	30-40

Estimates of past exposure based on current membrane filter data

Nicholson, Mount Sinai [Nicholson, 1975]	10-15
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Automobile body repairers and mechanics. A study of brake-lining maintenance and repair work has found short-term concentrations of asbestos of 16.0, 3.3, and 2.6 f/ml at distances of 3-5 feet, 5-10 feet, and 10-20 feet, respectively, from a worker blowing dust out of automotive brake drums [Rohl et al, 1976]. Grinding truck brake-shoes gave an average concentration of four f/ml and bevelling produced an average count of 37 f/ml. Measurable concentrations (0.1 f/ml) were found at distances up to 75 feet from the blowing-out operation (14 minutes after), 60 feet from grinding and 30 feet from bevelling, indicating that other garage employees besides those directly involved in brake and clutch repair are at risk.

Average fiber concentrations during brake and clutch work, however, are much lower and average about 0.1-0.3 f/ml during the course of an entire brake repair job. These data and the sources are:

**Summary of Asbestos Concentrations During Automobile and
Truck Brake Maintenance Activities:
Long-Term Samples During Lining Removal and Replacement**

Source	Range of all concentrations measured (f/ml)	Range of garage mean concentrations (f/ml)
Personal		
NIOSH [R. Zumwalde, personal communication] Sampling may have been done during non-brake work. No information on work practices.	0.01-3.24	0.03-0.59
Hickish and Knight [1970] Appears typical of past work practices with air blowing of drums. Sampling throughout complete brake repair job.	0.08-7.09	0.68-3.1
Raybestos-Manhattan [J. Marsh, personal communication] Well-controlled exhaust ventilation utilized.	0.02-0.4	0.05-0.1

Area		
NIOSH [R. Zumwalde, personal communication]	0.01-1.72	0.1 -0.57
Hickish and Knight [1970]	0.07-0.28	0.15

Initial clinical surveys of garage mechanics indicate that they have a small excess prevalence of X-ray abnormalities ($\sim 5\%$) compared with blue-collar control groups, in agreement with the dust count information above [Nicholson, 1982].

Engine room personnel, seagoing vessels, United States Merchant Marine. The potential for exposure to asbestos insulation material on merchant ships is not confined to the shipyards where the ships are built or repaired. After the vessels have been put to sea, flaking and cracking of the asbestos insulating materials covering machinery casings, steam and hot water piping, and tanks are common. In the course of a voyage, crewmen make repairs on pipes, pipe flanges, or valve leaks. This generally requires tearing down the insulation materials and replacing them [Polland, unpublished]. A study of 6,671 X-ray films of marine engineers in the United States showed an unusually high proportion (16%–20%) of pleural abnormalities, indicating the adverse effects of inhaled asbestos. [R.N. Jones, 1980]. We have included all engine room personnel on seagoing vessels of the Merchant Marine in our estimates of the population at risk.

Maintenance employees: Chemicals and petroleum manufacturing. The manufacturing processes of chemical production and petroleum refining involve the use of extensive networks of pipes, boilers, and other high temperature equipment. Asbestos materials provide thermal insulation for these networks and a large force of maintenance workers is employed to maintain and repair the production equipment. A study of maintenance workers in a large chemical plant and an oil refinery showed relatively frequent chest X-ray abnormalities [Lilis et al, 1980]. These findings strongly suggest that asbestos exposure characteristic of maintenance work in chemical plants and in oil refineries, including indirect ("bystander") exposure, results in risks comparable to those documented for other types of asbestos exposure in other industries and occupations. We have included all maintenance workers in the chemicals and allied products (SIC 28) and petroleum refining and coal products (SIC 29) in our estimates of the population at risk.

Steam locomotive repair. Employees engaged in the overhaul of railroad engines during the period when steam locomotives were in service were heavily exposed to asbestos. The practices used in the "back shops" where overhauls were conducted, resulted in the generation of clouds of asbestos dust that contaminated the environment of all who worked in the area [Mancuso, 1976]. Five mesotheliomas have recently been identified by NIOSH among former employees of one shop in Reading, Pennsylvania. We included all employees of railroad repair back shops in our at-risk estimates for the decade of the 1940s (when steam locomotives were the predominant type). For the 1950s (when the proportion of all locomotives in service which were steam declined from 63.4% to 1.7%), we reduced the annual number of employees at-risk by the annual proportion of nonsteam locomotives to all locomotives.

Stationary engineers, stationary firemen, and power station operators. Operation and maintenance of stationary engines and mechanical equipment to provide utilities for buildings and industrial processes involve the same types of exposure to asbestos-containing materials as are described above under electric, gas, and combination utility services. A preliminary field survey of 34 stationary engineers by this labora-

tory in the New York metropolitan area has found X-ray abnormalities consistent with asbestos-induced changes in 60% of the employees with more than 20 years of experience in this trade. We have included all employees in this occupational group in our estimates of the population at risk.

Population Estimates

In estimating the mortality (or morbidity) from past exposure to asbestos, we would wish information on the number of individuals exposed; the distribution of their employment periods; the time, duration, and intensity of the asbestos concentrations to which they were exposed; and mortality data, by industry, correlated with the above variables. Unfortunately, we have little of the above data. There are limited data on the number of individuals exposed to asbestos in different calendar periods of time. For some industries data are good (primary asbestos manufacturing, shipbuilding, auto repair and, to a lesser extent, insulation work). Much less certain are data on exposed populations in construction, secondary manufacturing, and the maintenance industries. Least certain is information on the turnover in a given industrial segment. Exposure data are available in recent years, but generally only from a limited number of measurements in an industry. Extrapolations to earlier years are possible but necessarily uncertain. Of most use are current data on the mortality of entire population groups exposed in previous years. Such information, if related to exposure periods, eliminates our need for information on exposure distributions as the mortality data for an entire group includes all exposure circumstances.

Further, as will be demonstrated subsequently, several studies show that the risk of lung cancer is linearly related to the total fiber exposure. This information allows one to properly account for different durations of employment in a given industry. Moreover, for the purposes of estimating excess mortality, it also reduces our need for accurate information on work force turnover within an industrial segment. The excess mortality for 1,000 men exposed for ten years is the same as for 2,000 men exposed for five. The important parameter is the person-years-at-risk. Thus, information on the total work force exposed at various points in time is much more important than information on turnover. However, for consideration of surveillance activities, one would wish knowledge of the total population at risk. This can be estimated, but greater uncertainties exist in the values obtained than in the number of asbestos-related cancers that might develop.

Methodological Considerations

Considerable information is available from data published by the Bureau of Labor Statistics and from industry or union sources on the number of individuals employed in an industry at periods of time. Data from publications of the Department of Labor also provide some information on the number of individuals entering or leaving a given industry on a yearly and monthly basis. For some industries subsequent to 1958, this includes information on the fractional number of accessions and separations that occurred for given employees within a calendar period. Often data are provided on the total fractional number of new hires, recalls, layoffs, and quits. While the information on the fractional number of new hires is of use to us in estimating the population entering a given industry, it does not represent true new hires for our purposes. This is because the industry data are based on individual establishment experiences. A new hire for an establishment may be an individual who previously worked in another establish-

ment in the same industry. For some manufacturing industries, this may not be too great a duplication, but for construction trades particularly, it represents significant duplication.

To estimate the population at risk for a period of years, it would be most desirable to have information on the number of new employees entering a given occupation or industry at different points in time and information on the number of individuals currently leaving that occupation or industry permanently. If N = the number in an industry, α = the fractional number of new entrants in an occupation or industry in a given year ($N_{\text{new}}/N_{\text{tot}}$), and β = fractional number leaving an occupation or industry permanently, the change in an industry work force can be represented by $dN = N \times (\alpha - \beta)dt$.

For small changes in N , $N = N_0 e^{(\alpha - \beta)t}$. In this model, in the absence of new entrants into an industry, the work force will decrease with a half-life, $T_{0.5} = 0.693/\beta$. In the absence of any separations, it will increase with the doubling time, $T_2 = 0.693/\alpha$. In any steady-state or near-steady-state situation, where $\alpha = \beta$, the average duration of employment is equal to $1/\alpha$. When one considers finite changes over a year period of time, $\Delta N = (\alpha - \beta)N$, where ΔN is the net increase or decrease. Thus, $\alpha = \beta + (\Delta N/N)$. If we consider the time necessary to achieve complete replacement of a work force in a steady-state situation, $\Delta N = N = \alpha NT$. Thus T , the time necessary for work force replacement is equal to $1/\alpha$ as expected from the earlier consideration of continuous changes. As indicated previously, we will be using information on the number of new entrants into a trade or industry, coupled with their average period of employment, to generate estimates on the expected excess mortality from past exposure to asbestos. The excess mortality among a group of individuals entering an industry during a decade will be proportional to $\alpha N \times T$ (new hires \times employment period) = $k\alpha N \times 1/\alpha = kN$, where k , the proportionality constant, includes the appropriate risk and exposure variables for the industry. *Thus, the crucial item in estimating mortality in a steady-state work situation is information on the number employed in an industry rather than the number of new hires entering it.* More detailed information is only necessary if there are significant changes in the workforce over the period of time being considered.

Asbestos-Exposed Work Force

The data on the population exposed to asbestos in different industries has been estimated using the Bureau of Labor Statistics information on employment and earnings in the United States, 1909–1978. Here direct data are available on the yearly employment in the following industries under consideration: primary asbestos manufacturing; selected secondary asbestos manufacturing industries; construction; electric, gas and utility services; and chemical and oil refining employees. The segments of these industries that will be considered at risk have been described previously.

We used employment series published by the Bureau of Labor Statistics [1979] as the basis for estimating the number of persons employed. Where the data do not extend as far back as 1940, we extrapolated the BLS series to that year on the basis of regression equations with related variables (Table II) or on the assumption of a straight-line trend between Census Bureau data for 1939 (Census of Manufacturers) or 1940 (Census of Population) and the earliest year of the relevant BLS series.

In the construction industry, the employment data relate to "construction workers." This group covers "workers up through the level of working supervisors, who are

engaged directly on the construction project either at the site or working in shops or yards at jobs ordinarily performed by members of construction trades. Exclusions from this category include executive and managerial personnel, professional and technical employees, and routine office workers" [Bureau of Labor Statistics, 1976].

In electric, gas, and combination utility services, the employment data relate to "physical workers." This group includes working foremen and other nonsupervisory workers engaged in nonoffice functions [Department of Labor, 1979].

In manufacturing industries (including private shipbuilding and repair), the employment data relate to "production workers." This group covers those employees, up through the level of working supervisors, who are engaged directly in the manufacture of the product. Among the exclusions from this category are persons in executive and managerial positions, those engaged in office work, and professional and technical functions [Bureau of Labor Statistics, 1976].

In the chemicals and allied products industry, it was estimated that 27% of the BLS employment figure represented maintenance workers. This proportion was calculated from the BLS Reports on 1971 occupational employment in this industry [Bureau of Labor Statistics, 1974]. The following classifications were excluded from the maintenance occupations to avoid duplication: insulation workers, stationary engineers, stationary boiler tenders.

In petroleum refining and coal products, it was estimated that 40% of the petroleum refining production employees and 20% of the production employees in the remaining divisions of the industry represented maintenance employees [Bureau of Labor Statistics, 1965]. The 1940 employment in the industry was estimated on the basis of a straight-line interpolation between the 1939 figure reported by the Bureau of the Census [1939], and the 1944 BLS figure. The same maintenance occupations were excluded as is noted under chemicals (above) to avoid duplication.

Data are not available that allow direct use of BLS employment data to estimate the number of individuals employed in insulation work, shipbuilding, automotive maintenance, merchant marine engine room work, and steam locomotive repair. Sepa-

TABLE II. BLS Employment Series Extrapolated to 1940 by Means of Regression Equations

Series to which extrapolation was applied	Related variable used for estimation	Measure of validity (r^2)
Construction—general building contractors: construction workers (SIC 15)	Construction—all employees 1964-1973 (SIC 15, 16, 17)	0.97
Construction—other than building general contractors: construction workers (SIC 16)	Construction—all employees 1960-1971 (SIC 15, 16, 17)	0.68
Construction—special trade contractors: construction workers (SIC 17)	Construction—all employees 1947-1956 (SIC 15, 16, 17)	0.99
Electric, gas, combined utilities employed	Production of utilities 1950-1959	0.84
Manufacturing: heating equipment excluding electrical: production workers	Manufacturing—fabricated structural metal products: production workers, 1972-1979	0.61

rate data are available in these industries from union sources, trade associations, the US Navy, and other government sources.

Insulation workers. For this important group of asbestos-exposed individuals, we will utilize information from the International Association of Heat and Frost Insulators and Asbestos Workers (IAHFIAW) to estimate the work force at any time and the new entrants into the trade [International Association of Heat and Frost Insulators and Asbestos Workers, unpublished; R. Steinfurth, personal communication]. The data available from the union are presented in Table III, which provides information on the cumulative entrants into the union, reduced by the number of Canadian members. Also available are data on the actual union membership in recent years and the number of new entrants and separations on an annual basis. For the years prior to 1960 where such data are uncertain, the estimates of Union membership were extrapolated from the trend available in the years 1960–1980. A small correction to the union membership is made for the estimated number of retired members over age 65. This correction is a small one because the high mortality in this trade limits the number who attain age 65.

The number of union construction insulation workers in Table III is increased by 40% for the years subsequent to World War II to account for workers employed on union jobs on a temporary (permit) basis and by an amount equal to the union membership to account for construction insulation workers not so represented. For the year 1940, few individuals would have been employed on permit because of the scarcity of jobs at that time. However, during World War II, a large number of insulators were so employed, particularly in shipyards. Data suggest that 0.2% of the wartime shipyard work force of 4,500,000 men and women were insulators. Thus 9,000 individuals would have been employed for approximately one year in this industry.

Unpublished data from the Bureau of Labor Statistics estimates that 31,900 men were at work during the spring of 1978 as insulation workers in construction and an additional 19,100 employed in industry elsewhere.¹ The 31,900 estimate from Bureau of Labor data is a reasonable agreement with the 38,900 estimate using union information as described above. Short-term layoffs during 1978 could well account for at least 10% of the work force. We will use the mean of the Bureau of Labor Statistics estimate and the estimate from union data as the value for construction insulation workers. This will decrease the values in Table III by 8.3%. The adjusted total number of construction insulators will then be increased by 54.4% (19,100/35,900) to account for insulators employed in maintenance elsewhere.

Shipbuilding and repair. BLS data are available on civilian production shipyard workers. The number of employees in Naval shipyards was obtained from data of the US Navy [J.K. Nunneley, Department of the Navy, personal communication, April 22, 1980]. This information is listed in Table IV. While the Navy estimates that only 50% of the yard work force is exposed to asbestos, the data on mortality and morbidity that we will use estimates risk for all shipyard workers as a group. We will utilize, therefore, the percentage of civilian yard workers that are production employees for the Naval shipyard considered to be exposed to asbestos. (This ranges from 92% in 1950 to 80% in 1975). In estimating the shipyard employment for 1945, we have used a value of 175,000, which is intermediate between 1940 employment and that of the years subse-

¹Based on the ratio of 1978 total employment reported by BLS (51,000) to the number employed in construction (31,948), an unpublished BLS estimate.

TABLE III. Insulator Work Force and New Hires Using Data From the International Association of Heat and Frost Insulators and Asbestos Workers*

Year	Cumulative new members (January)	Estimated union membership	Membership as a percentage of cumulative members ^a	Estimated percentage of retired (> age 65)	Estimated percentage of Canadian membership	IAHIFAW active US membership	Estimated number of construction insulators
1940	9,100	6,280	69.0	2.5	0.0	6,120	12,250
1945	12,580	8,300	66.0	2.7	3.0	7,830	18,800
1950	16,360	10,310	63.0	3.0	3.1	9,690	23,260
1955	22,150	13,290	60.0	3.5	7.0	11,930	28,630
1960	26,800	15,750	58.7	4.0	8.0	13,910	33,380
1965	31,000	17,720	57.2	4.5	8.6	15,470	37,120
1967	32,700	17,800	54.4	4.9	9.9	15,250	36,610
1970	35,400	18,500	52.3	5.0	12.0	15,470	37,120
1975	41,000	19,800	48.3	5.5	14.0	16,090	38,620
1978	44,400	20,200	45.5	6.0	16.0	15,950	38,280
1980	46,600	20,000	42.9	6.0	16.6	15,680	37,630

*Source: Roy Sienlurth, Director, IAHIFAW Health Hazard Program (personal communication).

^aExtrapolation from 1955 to 1940 was based on the trend of this parameter.

quent to World War II. We will consider this to be the "permanent" work force that would have been employed in the absence of World War II. During that conflict, it is estimated that an additional 4,325,000 men worked in shipyards for short periods of time [Selikoff and Hammond, 1978]. Their mortality and that of 9,000 wartime shipyard insulators will be estimated separately.

Automobile maintenance and repair. Mechanics exposed to asbestos during brake and clutch maintenance are included in SIC 75, auto repair, services and garages and SIC 515-2, new and used car dealers, and some in SIC 554, gasoline service stations. As it is not possible to separate mechanics from other employees in these categories, we have used census data of the number of individuals employed as mechanics in auto maintenance and auto body repair. Intercensus data were developed using a linear interpolation. See Table V for the basic data utilized.

Railroad steam locomotive repair. We have utilized employment data reported by the Association of American Railroads for occupations exposed to asbestos during the maintenance of steam railroad locomotives. This was done by reducing the number of men classified in equipment and stores [Association of American Railroads, annual] by 45% to reflect the proportion of the total craftsmen accounted for by the carmen classification. (Carmen were generally engaged in maintenance of railway cars rather

TABLE IV. Estimated Population at Work in United States Naval Shipyards, 1940-1979 (in thousands)*

Years	Employed at start of quinquennium	Estimated accessions during quinquennium
1940-1944	72	480
1945-1949	335	267
1950-1954	71	132
1955-1959	112	68
1960-1964	96	73
1965-1969	81	93
1970-1974	82	47
1975-1979	60	55

*Source: JK Nunneley, United States Department of the Navy (personal communication, April 22, 1980).

TABLE V. The Population Exposed to Asbestos in Automobile Maintenance and Repair

Year	Census ^a data (thousands)	Motor ^b vehicle registrations (millions)	Interpolated population at risk
1940	372	33	372
1945		32	370
1950	647	50	647
1955		63	655
1960	661	74	661
1965		92	800
1970	912	108	912
1975 ^c		133	1,100

^aIncludes auto body repairmen.

^bFrom Highway Statistics (annual) US Federal Highway Administration.

^cWeston estimated that 900,000 workers were continuously exposed to asbestos in automobile brake repair and 1,070,000 were exposed occasionally or infrequently.

than locomotives.) The remaining number was reduced by 50% to exclude employees who were located at maintenance facilities other than "back shops" [DeHague, 1980]. The balance was reduced by 11% to exclude salaried supervisors, coach cleaners, and stores laborers. As described previously, the resulting number for the years 1950-1960 was reduced by the percentage of steam locomotives in service. These data are listed in Table VI.

A summary of the employment data for all of the previously mentioned occupations is given in Table VII for five-year intervals. The data are quite stable for the years 1950-1980 and well reflect both employment and its trend with time. One exception is the 1950 value for shipbuilding which is unrepresentative; for the five years, 1948-1952, employment averaged 189,000.

TABLE VI. Employment, Maintenance of Equipment and Stores, Class I Railroads

Year	Numbers of ^a employees (in thousands)	Locomotives ^b in service		Percentage steam	Exposed employees
		steam	diesel		
1940	281	41.1	0.5	98.8	69
1945	387	39.7	3.0	93.0	95
1950	348	26.7	15.4	63.4	54
1955	273	6.3	26.6	19.1	13
1960	184	0.5	29.1	1.7	1

^aAssociation of American Railroads, 1940-1960.

^bAssociation of American Railroads, Annual, and Interstate Commerce Commission, 1961, 1958.

TABLE VII. Employed Populations Potentially Exposed to Asbestos in Selected Occupations and Industries, 1940-1975

Industry of occupation	Number employed in calendar year (in thousands)							
	40	45	50	55	60	65	70	75
Primary asbestos manufacturing	23	32	35	37	35	35	32	31
Secondary asbestos manufacturing	30	60	75	75	84	93	108	114
Insulation work ^a	17	27 ^b	33	41	47	53	53	55
Shipbuilding and repair	157	175 ^c	128 ^d	194	184	185	181	177
Construction trades	426	379	741	893	1,102	1,215	1,341	1,029
Railroad engine repair	69	95	54	13	1	0	0	0
Utility services	44	62	62	65	65	64	69	74
Stationary engineers and firemen	295	303	311	348	385	289	291	293
Chemical plant and refinery maintenance	113	194	186	200	188	187	205	200
Automobile maintenance	372	370	647	655	661	800	912	1,100
Marine engineer room personnel (except US Navy)	34	76	37	37	34	35	31	22
Totals	1,880	1,773	2,309	2,558	2,766	2,956	3,223	3,095

^aInsulators are included here and not in other trades in which they were employed, such as shipbuilding, construction, plant maintenance, or power generation.

^bDoes not include any of the 9,000 temporary wartime insulators in the shipbuilding industry.

^cEstimate of "permanent" shipyard work force. Does not include any of the 4,325,000 temporary wartime shipyard workers.

^dUnrepresentatively low value; average for 1948-1952 was 189.

New Entrants Into the Work Force 1940-1980

Data on the number of additions to the employment rolls in various manufacturing industries are reported monthly by the Bureau of Labor Statistics [1979]. However, BLS does not report cumulative annual rates for "new hires." Moreover, the BLS data refer to persons hired by individual establishments in each industry, not the number hired by the industry as a whole. There may be considerable duplication of persons involved in the new hires reported on a monthly basis over a year's time. There is additional duplication involved in counting new hires in a particular establishment who were previously employed in another establishment of the same industry. It was, therefore, necessary for us to develop a measure for estimating the unduplicated new hires in each industry for each year.

This was done by comparing the number of new hires obtained for major industry groups with data available from the continuous work history sample of the Social Security Administration (SSA) for the years 1957-1960 [Galloway, 1967]. Unfortunately, data are only available for major industry groups such as durable and non-durable goods manufacturing, construction, transportation, and services. Detailed information for individual industries is not provided. Information on the number of individuals who were employed in 1960 and were also employed in the same industry in 1957 is given in Table VIII. This allows one to calculate an annual transfer rate from one industry group to another but not from one industry to another within an industry group (eg, from the manufacture of asbestos products to the manufacture of bolts, nuts, and rivets). Bureau of Labor Statistics data on the permanent retirement or death in each of these industries are also available from Bureau of Labor Statistics publications. In a steady state, the SSA separation rate plus the annual rate of retirement and deaths would equal the new hire rate. As three years is a relatively short follow-up, there would be some transfers back to an industry group after the observation period. The correction for this, however, would be relatively small and somewhat compensates for the greater adjustment required to account for transfers between industries within an industry group.

The SSA data are shown in Table IX and compared with the annual rate of new hires from the Bureau of Labor Statistics data for the years 1958-1960, corrected by the increase or decrease in the total work force over the three-year period of time (January 1958-January 1961). The correction consisted of attributing the annualized change in work force between 1958 and 1961 to a change in the number of new hires. Terminations are much less affected by work force changes and then only with severe conditions. The corrections were virtually all less than 10%.

In comparing the data obtained in this manner from the Social Security Administration with that estimated using BLS new hires, fractional employment additions in the chemical industry and oil refinery operation closely matched the fractional number of transfers from the nondurable goods industry (0.166 and 0.132 vs 0.111). For these industries, we will utilize the Bureau of Labor Statistics data on new hires in SIC 28 or SIC 29 reduced by 30% to reflect possible transfers within these respective industries. Transfers are expected to occur inasmuch as the industries are concentrated within geographic areas and movement from one company to another is expected. This reduces the new hire rate for oil refineries to a value less than that for the nondurable goods industry as a whole. However, both oil refinery and chemical manufacturing have much less labor turnover than other industries in the nondurable goods manufacturing segment.

TABLE VIII. Industry of Major Job: Male Wage and Salary Workers Employed in Both 1957 and 1960 (Based on 1% Sample of Social Security Administration Data)*

Wage and salary workers employed in both 1957 and 1960	Manufacturing			Construction	Transportation, communications, public utilities	Services
	All	Durable goods	Nondurable goods			
All workers whose major job was in this industry in 1957	123,713	78,458	45,255	27,603	22,507	30,019
Industry of major job in 1960 the same as in 1957	102,854	63,676	34,653	19,280	17,906	20,778
Annualized "permanent" separations from work sector	0.063	0.072	0.093	0.127	0.079	0.130

*Source: Interindustry Labor Mobility in the United States 1957 to 1960 [Galloway, 1967].

TABLE IX. The Average Fractional Number of New Hires Entering a Specific Industry Group Each Year During the years 1958-1960

Industry	Change of industry from SSA continuous work history	Retirements and deaths	Annual permanent transfers from industry	BLS data on new hires	SIC group used for BLS estimate
All manufacturing	0.063	0.018	0.081	0.280	20-39
Durable goods manufacturing	0.072	0.018	0.090	0.265	24-25, 32-39
Primary asbestos products				0.343	329 ^a
Secondary asbestos products					
Heating equipment				0.240	343 ^b
Boiler shops				0.290	3443
Furnaces and ovens				0.159	356
Electrical housewares				0.199	363
Shipbuilding and repair				0.432	3731
Construction	0.127	0.020	0.147	(0.030)	15-17
Insulation work (IAHFIAW)				NA	
Other construction workers				0.303	20 23, 26-31
Nondurable goods manufacturing	0.093	0.018	0.111	0.166	28
Chemical plant maintenance				0.132	29
Oil refinery maintenance				NA	491-493
Transportation and public utilities	0.079	0.020	0.099	NA	
Marine engine room personnel	0.130	0.025	0.155	NA	
Services (stationary engineers)	0.130	0.013	0.142	NA	
Auto mechanics					

^aNew hires were estimated using durable goods new hires adjusted for the relationship between 329 and durable goods for the years 1972-1979.^bProduction work force for the years 1958-1960 was based on durable goods and the relationship between 343 and durable goods for the years 1972-1979.

NA, not available.

For primary and secondary asbestos manufacturing, it would be expected that there would be less transfer between similar companies. This occurs because of the widespread geographical distribution of the respective plants. Individuals terminated by one company would unlikely be hired by another manufacturer in the same industry. Thus, we will adopt a value for the new hires in primary and secondary manufacturing that would be equal to 80% that of the Bureau of Labor Statistics data. It would be expected that a greater percentage of terminated shipyard employees would be rehired by other yards or by the same yard at some later date. This occurs because of the highly fluctuating nature of shipyard business, depending as it does upon large contracts of uncertain frequency. Thus, for shipyard employees we will adopt a value of 50% of the Bureau of Labor Statistics' new hires rate for SIC 3831. The rate of new hires for 1958-1960 is, thus, 0.216. This compares with 0.138 estimated by the US Navy for naval shipyards in these years. The agreement is reasonable as turnover in government shipyards is considerably less than in civilian yards.

Individuals employed in construction trades (except insulation work), stationary engineers and firemen, and automobile mechanics are a highly mobile segment of the work force. However, they would tend to maintain employment in their respective trade, simply moving from one employer to another. Therefore, we feel that the Social Security Administration data on labor turnover well represent the members of these industries. It is felt that termination from employment in utility services, however, is less likely to lead to employment in a corresponding industry and data on new hires using Social Security Administration information would underestimate the actual percentage. Thus, we have increased the SSA new hires estimate by 50%. The sources of all new hire data are listed in Table X. For those industrial segments where the numbers of new hires are not provided, the new hires for all manufacturing are utilized adjusted by the ratio of new hires as determined by Social Security Administration data, 1958-1960, to new hires in the corresponding years for all manufacturing.

The number of new hires for insulation workers will utilize the data on new entrants into the insulation workers' union from their membership (column 1 of Table III). We will use the same acquisition data proportionately for the nonconstruction insulators, as data from the chemical and refining industry indicate average employment periods nearly equal to those of insulators. However, the turnover for those on permit and employed as nonunion workers is likely to be considerably higher. We have no information on what their turnover may be relative to union insulators but a value twice as great would appear to be reasonable. To account for this, we will increase the IAHFIAW new hires by 0.8 to account for permit workers, by 2.0 to account for nonunion new hires and by 1.2 for nonconstruction insulators. Thus the total insulator new hires will be five times the IAHFIAW US new members. The 9,000 wartime shipyard insulation workers employed for one year are also included in the new hires for the 1940-1949 decade. Their mortality, however, will be calculated separately as will that of other wartime shipyard workers.

It should be emphasized that these estimates are approximate and subjective. They are felt to be the best basis for estimating the number of new individuals that enter a given industrial segment and are important in estimating the total number of individuals potentially exposed to asbestos. As discussed previously, however, their influence on the total mortality experience from past exposure will be small. A misestimate on the new hires rate will lead to a balancing increase or decrease in the average employment

time. These annual new hire rates were applied to annual employment data for each occupation and industry to arrive at estimates of the number of new persons exposed to asbestos on the job in each year. The data were then cumulated for each decade since 1940. In those industries in which a significant portion of the employees were already included in our tally under an occupational group (asbestos and insulation workers; stationary engineers, stationary firemen and power station operators; or automobile body repairers and mechanics), an adjustment was made to the 1940 industry employment data and new-hires data to remove duplication. These adjustment factors were derived from the BLS National Industry-Occupational Matrix in the case of Asbestos and insulation workers [Bureau of Labor Statistics, 1969b] and the 1970 Census of Population in the case of stationary engineers, stationary firemen and power station operators. No adjustment was necessary for the automobile body repairers and mechanics since the duplication between this occupation and the industries included in this study is insignificant.

An additional adjustment in the new-hires data was made to eliminate the double-counting of persons who were hired in an occupation or industry during the period since 1940 and who had previously been exposed to asbestos in another occupation or industry. We developed an adjustment factor for this purpose by analyzing the occupational histories of 2,544 workers employed in operations exposed to asbestos in cohorts being studied by this laboratory. Table XI lists the percentage of individuals in several study groups with previous substantial exposure to asbestos (equivalent to greater than six months employment in a shipyard). This correction reduces the num-

TABLE X. Source of Annual New Hire Rates by Industry or Occupation

Industry or occupation	Source of annual new hire rates ^a	Average 1958-1961 new hire rates ^d
Primary asbestos manufacturing	$0.8 \times (\text{SIC } 329)^b$	0.294
Secondary asbestos manufacturing	$0.8 \times (\text{SIC } 343, 3443, 356, 363)^b$	0.127-0.232
Insulation	Data from union new entrants used	—
Shipbuilding and repair	$0.5 \times (\text{SIC } 3731)^b$ and US Navy data	0.216
Construction trades	$1 \times (\text{SIC } 20-39) \times (0.147/0.268)^c$	0.147
Railroad engine repair	$1 \times (\text{SIC } 20-39) \times (0.099/0.268)$	0.099
Utility services	$1.5 \times (\text{SIC } 20-39) \times (0.149/0.268)$	0.149
Stationary engineers and firemen	$1 \times (\text{SIC } 20-39) \times (0.155/0.268)$	0.155
Chemical plant and refinery	$0.7 \times (\text{SIC } 28)^b$	0.116
maintenance	$0.7 \times (\text{SIC } 29)^b$	0.092
Automobile maintenance	$1 \times (\text{SIC } 20-39) \times (0.142/0.268)$	0.142
Marine engine room personnel	$1 \times (\text{SIC } 20-39) \times (0.099/0.268)$	0.099

^aThe percentage of various workers within each SIC category, as described in the text, will be used as the basis population for calculating new hires.

^bData are utilized for the years available. For years for which new hire data were not published, the new hire data for all manufacturing were used, adjusted by the relationship to the specific SIC code for the years published.

^cThe rate 0.268 is the average annual fraction of new hires in manufacturing for the years 1958-1960, corrected for changes in the work force.

^dValues for other years are proportional to the new hire rates in the indicated SIC classification.

ber of people ever exposed by 10% (the correction factor used). It will not reduce the mortality, however, as we must account for all person-years of exposure in asbestos-related industries. This will be done by using the adjusted population of new entrants to calculate an average time of exposure (see below) which will overestimate the exposure time by 10% to account for the 10% reduction in exposed populations. It should be emphasized that the uncertainties in either the populations exposed or the average durations of employment greatly exceed 10%

POPULATION AT RISK

The results of the estimation of employment and new-hires at risk are shown in Table XII, indicating that approximately 27,500,000 individuals were potentially exposed to asbestos from 1940 through 1979 in the occupations analyzed. The uncertainties in estimating this number have been described previously, but they cannot be overstressed. The number is an approximation. Further, it includes a large number of individuals whose potential exposure to asbestos would have been of low intensity or of short duration because of high labor turnover (see section on lower risk population). Finally, the term potential should be emphasized. In categorizing a segment of a work force (such as all production shipyard workers) as being potentially exposed to asbestos, some individuals will be included with no actual exposure. On the other hand, individuals in other jobs (such as management) who did have exposure were not counted. The numbers may or may not balance. These uncertainties will be compensated for in the estimates of mortality by using data on the mortality or morbidity of representative work-force segments, which will also include the full spectrum of exposure circumstances.

It should also be noted that a large number of asbestos-exposed individuals are not included in the estimates of Table XII. Important groups with identified risks include family contacts of asbestos-exposed workers, engine room personnel aboard US Navy ships in World War II, and individuals exposed environmentally to asbestos by virtue of residence or work near the use of asbestos. Additional exposures occur to many from the use of asbestos in surfacing materials in schools, night clubs, and auditoriums, or as fireproofing material in office buildings.

Average Duration of Employment

The average duration of employment can be calculated from the fractional new-hire rate adjusted by changes in total work force at different periods in time (see section on methodological considerations). Alternatively, the average employment over a decade can be divided by the average yearly number of new hires entering an industry to obtain the average employment time. In essence, this is the period of time that is required for the number of new entrants into an industry to completely replace the work force. These data for the years 1940-1979 are presented in Table XIII and were used for the average durations of exposure in each decade for each industry or occupational group.

Supplemental Labor Turnover Data

The Environmental Sciences Laboratory has access to several seniority lists of work forces employed in asbestos-using industries. These include a large integrated asbestos products manufacturer, a major East Coast shipyard and a plastics polymer plant. Additionally, information on the employment times of all employees in an as-

TABLE XI. Workers Exposed to Asbestos in Five Cohorts Under Study by the Environmental Sciences Laboratory, Mount Sinai School of Medicine

Location	Industry/occupation	Period	No. of workers currently exposed	
			Total	Also exposed in previous employment
Metropolitan New York	Brake repair and maintenance	1979-1980	699	104
Groton, Connecticut	Shipyard	1976	1,024	98
Baltimore, Maryland	Shipyard	1979	286	10
Port Allegany, Pennsylvania	Asbestos products manufacturing	1979	254	21
Quincy, Massachusetts	Shipyard	1979	281	16

TABLE XII. Population at Risk to Asbestos-Associated Disease: Workers Exposed to Asbestos in Selected Occupations and Industries, 1940-1979 (in thousands)

Industries or occupations	1940	New entrants				Totals
		1940-1949	1950-1959	1960-1969	1970-1979	
Primary asbestos manufacturing	23	200	103	86	76	488
Secondary asbestos manufacturing	30	324	227	259	308	1,148
Insulation work ^a	17	35	47	38	47	184
Temporary, World War II		9				9
Shipbuilding and repair	157	433	354	434	383	1,761
Temporary, World War II		4,325				4,325
Construction trades	426	1,786	1,452	1,866	1,975	7,505
Railroad engine repair	69	194	26	0	0	289
Utility services	44	223	116	116	129	628
Stationary engineers and firemen	295	1,136	623	549	510	3,113
Chemical plant and refinery maintenance	104	542	260	239	248	1,393
Automobile maintenance	372	1,884	1,099	1,282	1,779	6,416
Marine engineer room personnel (except US Navy)	34	121	46	40	27	268
Totals	1,571	11,202	4,353	4,909	5,482	27,527

^a Insulators are included here and not in other trades in which they were employed, such as shipbuilding, construction, plant maintenance, or power generation.

bestos insulation production plant is available. These sources can be utilized for comparison with the data obtained from the Social Security Administration and Bureau of Labor Statistics on labor turnover. They can further be utilized to obtain estimates of the distribution of employment times in a given industry by comparing the number of individuals actually employed to those that were known to have been hired in different time periods. The latter quantity is available from the seniority lists as individuals were

assigned sequential clock numbers upon employment. These data are presented in Table XIV and supplement the turnover data obtained otherwise.

One notable feature is that the asbestos products manufacturer has an extremely high turnover during the first month after hire. This occurs because of terminations of individuals during a one-month probationary period. After that time, the man enters the union bargaining unit, and any individual terminations are subject to grievance procedures. While such practices are not universal, they are certainly not unique, and it is expected that in primary and secondary manufacturing an extremely high turnover will result during the first month or two of employment as individuals are screened for their performance and suitability for a job. In contrast, in construction, shipbuilding, automobile maintenance, and other industries that require a skill, the turnover in early periods of time is expected to be less as an individual would have demonstrated professional competence prior to being hired. Further, he would likely be represented by a union before employment with a given employer. Thus, nonarbitratable dismissals are less common.

TABLE XIII. The Average Employment Time of All Individuals Potentially Exposed to Asbestos, 1940-1979

Industry or occupation	Average duration of employment (years) calendar periods			
	1940-1949	1950-1959	1960-1969	1970-1979
Primary asbestos manufacturing 1.6	1.6	3.5	3.8	4.0
Secondary asbestos manufacturing	2.0	3.5	4.0	3.8
Insulation work	13.7 ^a	12.4	15.9	12.5
Shipbuilding and repair	4.3 ^a	5.3	4.2	4.6
Construction trades	3.3	8.3	7.5	4.5
Railroad engine repair	4.4	7.7	—	—
Utility services	2.8	5.7	5.7	6.0
Stationary engineers and firemen	2.7	6.3	5.8	5.7
Chemical plant and refinery maintenance	3.7	7.4	8.7	8.1
Automobile maintenance	2.7	6.0	7.7	7.0
Marine engineer room personnel (except US Navy)	4.7	7.4	7.8	6.1

^aDoes not include short-term wartime shipyard workers.

TABLE XIV. Labor Turnover in Selected Industrial Establishments

Establishment	Time period	Number of individuals considered	Number employed by time after hire			
			1 year	6 months	2 months	1 month
Shipyard products	1977	1,449	—	73%	80%	—
Asbestos products manufacture	1965-1966	759	37%	—	51%	53%
Asbestos products manufacture	1961-1962	306	42%	—	45%	48%
Asbestos products manufacture	1957-1958	108	27%	—	52%	75%
Plastics production	1961-1962	17	—	100%	100%	100%
Insulation products manufacture	1941-1945	820	38%	53%	82%	93%

A study of workers exposed to brominated chemicals in three plants provides data on the distribution of employment times of all 3,579 individuals employed in the facilities [Wong, 1981]. It substantiates the presence of a large number of individuals with very short employment times. Of all employees, 16.4% worked for less than one month and an additional 28.5% for 1-5.9 months. The full distribution of employment times can be characterized by a two-component decreasing exponential. Thus, the work force can be considered as made up of two groups. The average employment time of one, consisting of approximately 2,200 individuals, was 0.5 years and of the other, with 1,400 individuals, was 11.7 years in good agreement with the data of Table XIII.

Relative Risk by Industry

To calculate the asbestos-related cancer mortality in a given industry or operation, it is necessary to have an absolute or relative measure of exposure for the employee group. While detailed information is not available on the asbestos air concentrations that have been prevalent in previous years in each of the above industries, estimates can be made of the relative risk of death from asbestos exposure on the basis of a variety of other studies. In the calculation of asbestos-related cancer mortality for a given industry or occupation, we will utilize the available data for insulation workers for the dose and time dependence of asbestos cancer. To translate available data for insulation workers to other industries, it is necessary to establish measures of exposure for the different groups considered at risk relative to that of insulation workers. These *relative risks for equal times of employment* will be determined by three indices. The primary one is the directly measured mortality data, especially that of mesothelioma or lung cancer, in an industry or trade. A second is the directly measured average concentrations of asbestos that can be attributed to the work activity. The third is the prevalence of X-ray abnormalities after long-term employment in an industry. Here, we will assume that the percentage of X-ray abnormalities attributable to an exposure circumstance after 20 years of employment will be proportional to the total dose of asbestos inhaled by the workers in that industry. Where the percentage of abnormal X-rays approaches 100%, the relative risks will be determined using the percentages of X-rays having a category 2 or greater abnormality on the ILO U/C scale. Information on these direct and indirect measures is shown in Table XV along with the sources of the various data.

For industries in which none of the above indices are available (construction, railroad steam engine repair) or for which the data are very uncertain, relative risk estimates were made from the numbers of mesotheliomas identified among individuals in different asbestos exposure circumstances compared with the total work force exposed. These data utilized the nationwide survey of mesothelioma in 1972 and 1973 by McDonald and McDonald [1980]. The numbers from this series are shown in Table XVI.

The relative risks, by industry, estimated from all of the above data, are listed in Table XVII. Also Indicated in Table XVII are the principal data sources considered in the relative risk estimates. The data available for the estimates are limited and the estimates are necessarily approximate. For the years 1972-1979, the relative risks for manufacturing, insulation work, shipbuilding, and utility employment will be reduced to 0.1, and those of the other industries (except automobile maintenance) to 0.05 to reflect the adoption of control measures. Further, exposures subsequent to 1979 will not be considered.

TABLE XV. Indices of Relative Asbestos Exposure in Selected Occupations and Industries

Industry of occupation	Estimated average fiber concentrations	Relative risk of lung cancer	Percentage of deaths from mesothelioma	Applicable employment period (years)	Percentage of:		Applicable employment period (years)
					parenchymal abnormalities	pleural abnormalities	
Primary manufacturing	20-40	2.8 ^a -6.1 ^b	2.6 ^b -9.1 ^a	1-20 +			
Insulation work	15 ^a	4.8 ^c	8.7	20 +	85 ^d	42 ^d	20 +
Shipbuilding and repair	2 ^f	1.6 ^e		2-3	86 ^b	17 ^b	20 +
Chemical plant and refinery maintenance		1.5 ^g		15 est	33 ⁱ	3 ⁱ	20 +
Automotive maintenance	0.1-0.3 ^k				5 ^k		10 +
Marine engine room personnel						16-20 ^l	15

^a[Nicholson, 1981a.]^b[Seidman et al, 1979.]^c[Selikoff et al, 1979.]^d[Selikoff et al, 1965.]^e[Selikoff, 1965.]^f[J. Thorton, quoted in Enterline, 1981.]^g[Blot et al, 1981.]^h[Selikoff et al, 1981.]ⁱ[Harris et al, 1979.]^j[Lillis et al, 1980.]^k[Nicholson, 1982.]^l[R. N. Jones, 1980.]

TABLE XVI. The Numbers of Mesotheliomas by Work Activity in North America (1960-1972, Canada; 1972, USA)*

Occupation or industry	Number of cases
Primary and secondary manufacturing	21
Insulation work	27
Shipbuilding and repair	21-49 ^a
Construction trades	45-76 ^b
Railroad engine repair	5
Utility services	
Stationary engineers and firemen	13 +
Chemical plant and refinery maintenance	3
Automobile maintenance	11
"Heating trades"	59 ^c

*[McDonald and McDonald, 1980].

^aHighest number only includes some insulators and heating trades workers.

^bHighest number may include some insulators, shipyard workers or individuals with employment in heating trades.

^cIncludes many individuals that would be assigned to other categories, as stationary engineers and firemen (furnace repair), shipyard employment (welders, steamfitters), utilities (plumbing, heating, boiler work), manufacturing (boilermakers).

TABLE XVII. The Risk of Asbestos Cancer Relative to Insulation Work After 25 Years Employment

Occupation or industry	Risk	Source of data for estimate
Primary manufacturing	1	Group mortality data, exposure measurements
Secondary manufacturing	0.5	Exposure measurements
Insulation work	1	Reference population
Shipbuilding and repair (except insularors)	0.5	Group mortality data, prevalence of X-ray abnormalities
Construction trades ^a (except insulators)	0.15-0.25 ^b	No. of mesothelioma cases in general population
Railroad engine repair	0.2	No. of mesothelioma cases in general population
Utility services	0.3	No. of mesothelioma cases in general population
Stationary engineers and firemen	0.15	Prevalence of X-ray abnormalities
Chemical plant and refinery maintenance	0.15	Prevalence of X-ray abnormalities, group mortality data
Automobile maintenance	0.04	Prevalence of X-ray abnormalities, exposure measurements
Marine engine room personnel (except US Navy personnel)	0.1	Prevalence of X-ray abnormalities

^aSee test for percentage of construction population considered at risk.

^bRisk for years 1958-1972 when the use of sprayed asbestos fireproofing was common.

The relative risks in Table XVII for insulation work, manufacturing, utility services ("heating trades") shipyard employment, and construction yield "population" risks virtually identical to those found by McDonald and McDonald [1980] in their case-control analysis. They found values of 46.0, 6.1, 4.4, 2.8, and 2.6, respectively, for the relative risks of the above populations. Multiplying our equal exposure risks by

the average durations of employment of all workers from 1940 through 1969 (13.2, 2.0, 4.7, 1.9, and 6.4 years, respectively) and further dividing the risk for construction workers by two to account for the 50% of workers to whom we attributed no risk, we obtain for the relative "population" risks the values, 13.2, 1.3, 1.4, 0.95, and 0.5. Adjusting to the McDonald and McDonald [1980] risk of 46 for insulators, we obtain for "population" risks, 46.0, 4.6, 4.9, 3.3, and 1.8.

Lower Risk Population

While we are unable to obtain full data on the distribution of employment times in all industries, the information depicted above allows us to identify a segment of the work force with considerably less exposure to asbestos. Taking a period of employment of two months in primary manufacturing or insulation work as a measure of a low exposure, we have estimated the number of individuals with such an exposure among the 27,500,000 individuals identified previously. This would correspond to a total exposure of 2-3 f-yr/ml (12-18 f/ml \times 1/6 yr). The estimates were made assuming 40% of the new hires in primary and secondary manufacturing and 20% of the new hires in other industries left within two months. For longer periods, we utilized an exponential function, $e^{-\beta t}$, for the distribution of employment times where β is the average steady-state permanent separation rate. The period of employment characterizing "lower exposure" for a given industry will be inversely related to the relative risk of the industry (Table XVII). These data are presented in Table XVIII and suggest that 8,700,000 of those potentially exposed to asbestos will have a significantly lower risk by virtue of their short employment period. The extremely large number in automobile maintenance arises because of the low relative risk of asbestos disease in that industry. Thus, individuals with as much as four years of employment in automobile maintenance were included in the estimates that gave rise to Table XVIII.

The data in Table XVIII indicate that an enormous number of individuals are likely to have had *some* exposure to asbestos: 27,500,000 since 1940. Of this number, it is estimated that 21,000,000 were alive on January 1, 1980. (This figure was calculated

TABLE XVIII. The Percentage of Asbestos-Exposed Individuals With Lower Exposure*

	Total exposed		Number with lower exposure	Percentage with lower exposure
	1940	1940-1979		
Primary asbestos manufacturing	23	465	186	38
Secondary manufacturing	30	1,118	493	43
Insulation work	17	167	33	18
World War II		9	2	20
Shipbuilding and repair	157	1,604	362	20
World War II		4,325	1,303	30
Construction trades	426	7,079	1,842	24
Railroad engine repair	69	220	72	25
Utility services	44	584	141	22
Stationary engineers and firemen	295	2,818	834	27
Chemical plant and refinery maintenance	104	1,289	350	25
Automobile maintenance	372	6,044	3,032	47
Marine engine room personnel	34	234	75	28
Totals	1,571	25,956	8,715	32

Lower exposure is characterized as being less than that equivalent to two months employment in an asbestos factory or as an insulator (approximately 2-3 f-yr/ml). It is *not* to be construed as being without risk.

using procedures detailed in the mortality estimates to follow.) Of those exposed, 18,800,000 of the total and 14,100,000 of those alive on January 1, 1980 were estimated to have had an exposure greater than 2-3 f-yr/ml. Such exposures carry significant risk of asbestos disease (as will be detailed subsequently). Further, some risk of asbestos disease exists for the 6,900,000 alive on January 1, 1980, estimated to have experienced lesser exposures.

CANCER FROM OCCUPATIONAL ASBESTOS EXPOSURE: PROJECTIONS 1965-2030

In recent years, considerable data have accumulated that allow projections to be made of the cancer mortality associated with past exposure to asbestos. These include new information on the dose and time dependence of asbestos-related cancers in various occupational circumstances, an increased awareness of the various trades in which possible asbestos exposure occurred in past years, as well as information on the absolute and relative exposures of these different occupational groups. While the relevant data are less complete than desired, they are sufficient to allow estimates of future asbestos-related mortality to be made. These may be useful in directing priorities for appropriate surveillance and interventive activities that might be undertaken.

The Spectrum of Asbestos-Related Cancer

The spectrum of malignant disease that occurs from asbestos exposure is best seen in data from the mortality study of Selikoff et al [1979] on 17,800 insulation workers. This information is shown in Table XIX in which the numbers of deaths, by

TABLE XIX. Deaths Among 17,800 Asbestos Insulation Workers in the United States and Canada, January 1, 1967-December 31, 1976*

Underlying cause of death	Expected ^a	Observed		Ratio o/e	
		(BE)	(DC)	(BE)	(DC)
Total deaths, all causes	1658.9	2271	2271	1.37	1.37
Total cancer, all sites	319.7	995	922	3.11	2.88
Cancer of lung	105.6	486	429	4.60	4.06
Pleural mesothelioma	b	63	25	—	—
Peritoneal mesothelioma	b	112	24	—	—
Mesothelioma, n.o.s.	b	0	55	—	—
Cancer of esophagus	7.1	18	18	2.53	2.53
Cancer of stomach	14.2	22	18	1.54	1.26
Cancer of colon-rectum	38.1	59	58	1.55	1.52
Cancer of larynx	4.7	11	9	2.34	1.91
Cancer of pharynx, buccal	10.1	21	16	2.08	1.59
Cancer of kidney	8.1	19	18	2.36	2.23
All other cancer	131.8	184	252	1.40	1.91
Noninfectious pulmonary diseases, total	59.0	212	188	3.59	3.19
Asbestosis	b	168	78	—	—
All other causes	1280.2	1064	1161	0.83	0.91

*Number of men: 17,800, man-years of observation: 166,853. From Selikoff et al [1979].

^aExpected deaths are based upon white male age-specific US death rates of the US National Center for Health Studies, 1967-1976.

^bRates are not available, but these have been rare causes of death in the general population.

(BE) Best evidence; number of deaths categorized after review of best available information (autopsy, surgical, clinical). (DC) Number of deaths as recorded from death certificate information only.

cause, over a ten-year period, are tabulated along with those expected from national rates. Causes of death are characterized both according to those listed on the certificates of death (DC) and according to the best evidence (BE) available from a review of autopsy protocols, medical records, and pathological specimens. For most causes of death, the agreement is relatively good, but for mesothelioma and asbestosis, considerable differences exist. Because deaths from these causes are rare in the absence of asbestos exposure, their misdiagnosis has little effect upon general population rates. However, as they are common causes of death among asbestos-exposed workers, their misdiagnosis can seriously affect determination of asbestos mortality. Thus, the "best evidence" mortality will be used for the estimate of asbestos-related cancers. However, as we will attribute all excess cancer among insulators to their asbestos exposure (see below), the overall results will not differ greatly from that using certificate of death diagnosis. Higher rates of death at one site (as mesothelioma) will be balanced by lower rates at another (as pancreas).

In addition to mesothelioma and cancer of the lung, cancer of the stomach, colon, rectum, esophagus, larynx, pharynx, buccal cavity, and kidney are each elevated significantly compared with rates expected for these sites in the general population. (This group will be referred to subsequently as "asbestos-related" malignancies.) Opportunity for fiber contact with the epithelial surfaces of the lung and gastrointestinal tract is clearly evident. Exposure to the mesothelial tissue and kidney can occur as fibers readily penetrate into lung lymphatics and reach the pleural mesothelium ("pleural drift") or can be transported to the kidney or peritoneal mesothelium. Similarly, fiber dissemination occurs to other extrapulmonary organs, such as brain, liver, spleen, etc [Langer, 1974]. While excesses at these other sites are not of statistical significance for individual malignancies, the category "all other cancers" is elevated at a high level of significance ($p < 0.0001$), and we will attribute these excess malignancies to asbestos exposure as well. Their contribution accounts for less than 8% of the total excess cancer compared with the contribution of lung cancer, 56%; mesothelioma, 26%; and the other above specified "asbestos-related tumors," 10%.

The Time Course of Asbestos-Related Cancer

The time course of asbestos-related mortality from bronchogenic carcinoma is shown in Figure 1 according to ages for individuals exposed initially between ages 15 and 24, and 25 through 34. As can be seen, the two curves of relative risk, according to age, rise with the *same* slope and are separated by approximately ten years. This suggests that the *relative risk* of developing lung cancer is independent of age and of the pre-existing risk at the time of exposure. In contrast, had one plotted the *added risk* of cancer, the slope and the amount for the group first exposed at older ages would have been two to four times greater than for those exposed at younger ages. If one combines these data and plots them according to time from onset of exposure, the curve of Figure 2 is obtained. A linear increase with time from onset of exposure is seen for 35 to 40 years (to about the time when many insulators terminate employment). After 40 years the relative risk falls significantly, rather than remaining constant after cessation of exposure as might be expected from the linear increase with continued exposure. The decrease is not solely the result of the elimination of smokers from the population under observation as a similar fall occurs for those individuals who were smokers in 1967. (In calculating the relative risk of lung cancer in smokers, smoking-specific data from the American Cancer Society study of one million people were utilized [Hammond, 1966].) Selection processes, such as differing exposure patterns or differing individual

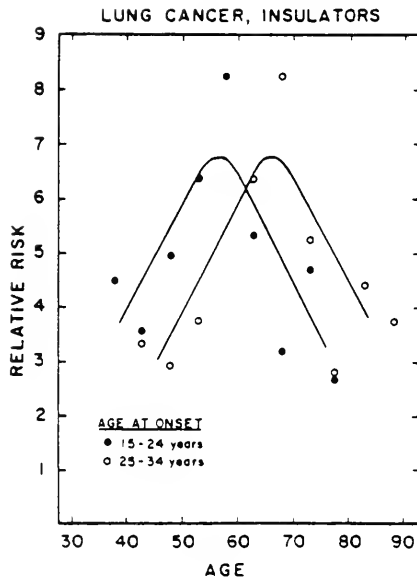


Fig. 1. The ratio of observed to expected deaths from lung cancer among insulation workmen according to age and age at onset of employment.

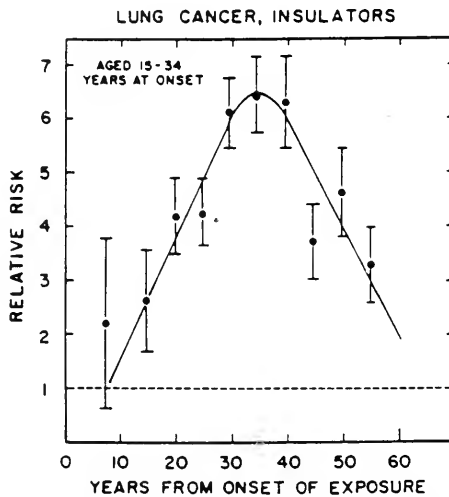


Fig. 2. The ratio of observed to expected deaths from lung cancer among insulation workmen according to time from onset of employment.

biological susceptibilities may play a role, but the exact explanation for the effect is not understood. It is, however, a general phenomenon seen in many mortality studies.

The early portion of the curve of Figure 2 is remarkable in two aspects. Firstly, it shows a linear increase in the relative risk of lung cancer according to time from onset of exposure. This suggests that the dose of asbestos received in a given period of time increases the risk of cancer by an amount that is proportional to that which existed in the absence of exposure. This increased *relative risk* is proportional to the dose of inhaled asbestos, which in turn is proportional to the time worked. Thus, the linear rise in Figure 2. However, the linear rise can occur only if the increased relative risk that is created by a given dose of asbestos continues to multiply the "background" risk for several decades (at least until age 60), even though the background risk will increase tenfold or twentyfold in 30 years. Secondly, the extrapolated line through the observed data points crosses the line of relative risk equal to one (that expected in an unexposed population) very close to the onset of exposure. At most, the line might be adjusted so that it passes through the relative risk of one line at a time from onset of exposure of about ten years. (Note that we are plotting the relative risk of death. Irreversible malignancy would have been initiated several years earlier, since usually one or two years elapse between identification of lung cancer and death, and it is likely that a malignant growth was present, unseen, for at least one or two years before becoming clinically evident.) This means that an increased relative risk appropriate to a given exposure is achieved very shortly after the exposure takes place. However, if there is a low risk in the absence of asbestos exposure, as in young workers, cancers that will arise from that increased relative risk may not be seen for many years or even decades until the background risk becomes significantly greater.

The same two points, 1) that the effect of an exposure to asbestos is to multiply the pre-existing risk of cancer in the exposed population and 2) that the multiplied risk

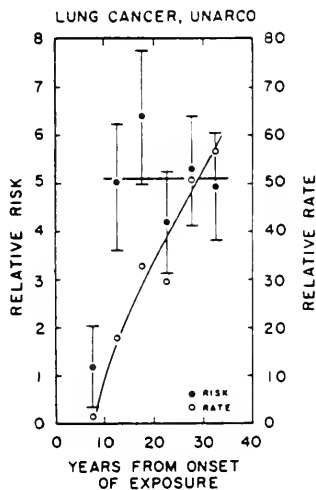


Fig. 3. The ratio of observed to expected deaths from lung cancer and the relative lung cancer mortality rates among asbestos insulation production employees according to time from onset of employment.

becomes manifest in a relatively short time, can also be seen in the mortality from lung cancer in a study of Seidman et al [1979]. Figure 3 depicts the time course of the mortality from lung cancer of a group (UNARCO) exposed for short periods of time, beginning five years after onset of exposure. As 77% were employed for less than two years, exposure largely ceased prior to the follow-up period. As can be seen, a rise to a significantly elevated relative risk occurs within ten years, and then that increased relative risk remains constant throughout the observation period of the study. Furthermore, the relative risk from a specific exposure is independent of the age at which the exposure began. This is seen in Table XX, where the relative risk of death for lung cancer for individuals exposed for less than and greater than nine months is listed according to the age at entrance into a ten-year observation period. Within a given age category, the relative risk is similar in different decades of observation, as we saw before in Figure 3 with the overall data. However, the relative risk also is independent of the age decade at entry into a ten-year observation period. (See lines labelled "All" in each exposure category.) There is some reduction in the oldest groups. This can be attributed to the same effects manifest at older ages in insulators or to relatively fewer cigarette smokers that might be present in the 50-59 year observation groups because of selective mortality.

In the calculation of asbestos-related cancer, the time course of nonmesothelial cancer will be treated as follows. The increase in the relative risk of lung cancer will begin 7.5 years after onset of exposure and increase linearly, following the line of Figure 2 for the number of years a specified group is employed. After a period equal to the average duration of employment, the relative risk will remain constant until 40 years from onset of exposure, after which it will linearly decrease to one over the subsequent three decades. The magnitude of the increase will be equal to that of Figure 2 for insulators and factory employees. The rate of increase for other groups will be proportional to their estimated exposure relative to that of insulators. The same time course

TABLE XX. Relative Risk of Lung Cancer During Ten-Year Intervals at Different Times From Onset of Exposure*

Years from onset of exposure	Age at start of period		
	30-39	40-49	50-59
Lower exposure (< 9 months)			
5	0.00 [0.35]	3.75 (2)	0.00 [3.04]
15	6.85 (1)	4.27 (3)	2.91 (4)
25	—	2.73 (2)	4.03 (6)
All	3.71 (1)	3.52 (7)	2.58 (10)
Higher exposure (> 9 months)			
5	0.00 [0.66]	11.94 (4)	9.93 (8)
15	19.07 (2)	11.45 (5)	5.62 (5)
25	—	13.13 (6)	7.41 (8)
All	11.12 (2)	12.32 (16)	7.48 (21)

*From Seidman et al [1979].

() = Number of cases.

[] = No cases seen. Number of cases "expected" on the basis of the average relative risk in the overall exposure category.

will be used for all other nonmesothelial tumors with the magnitude of the increase in insulators being adjusted by the observed frequency of these tumors compared with that expected and that of other groups by their estimated exposure relative to insulators as well.

The treatment of the time course of mesothelioma differs from that of lung cancer and other malignancies in that there is no background rate in the absence of asbestos exposure with which to compare the asbestos-related risk. Thus, it is necessary to utilize absolute risks of death. Figure 4 shows the risk of death of mesothelioma according to age for individuals exposed first between ages 15 and 24 and between ages 25 and 34 as in Figure 1. As can be seen, these data, while somewhat uncertain because of small numbers, roughly parallel one another by ten years as did the increased relative risk curves for lung cancer. Thus, the absolute risk of death from mesothelioma appears to be directly related to onset of exposure and is independent of the age at which the exposure occurs. The risk of death from mesothelioma among the insulation workers is plotted according to time from onset of exposure on the right side of Figure 4. It increases as the fourth or fifth power of time from onset of exposure for about 40 or 50 years. Thereafter, data are scanty and information on the time course is not reliable. For the purposes of analyzing the mortality experience among various groups of workers, the relationship depicted in Figure 4 will be used. After 45 years from onset of exposure, we will consider the risk of death from mesothelioma to remain constant at 1.2 per 100 person-years for insulation workers employed for 25 or more years. For insulators employed for shorter periods, the risk will be reduced by the fraction of 25 years worked. For other exposed groups the risks depicted in Figure 4 will be reduced by the relative exposure of the group compared with insulators and by the fraction of 25 years that a population is exposed.

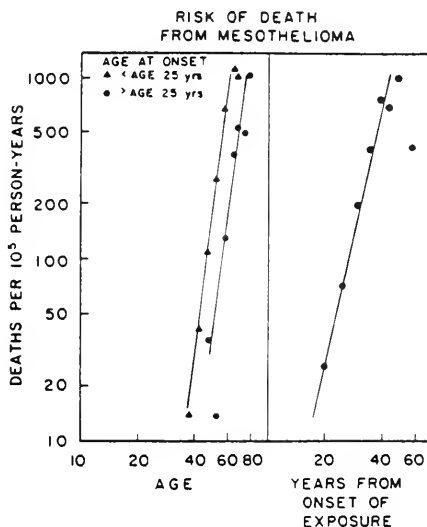


Fig. 4. The death rates for mesothelioma among insulation workmen according to age and age at onset of employment and according to time since onset of employment.

Dose-Response Relationships for Asbestos-Related Cancer

Four recent studies have demonstrated that the risk of lung cancer increases linearly with dose over a fairly wide range of exposures [Dement et al, in press; Henderson and Enterline, 1979; Liddell et al, 1977; Seidman et al, 1979]. Unfortunately, the studies are not directly comparable. For three, the measure of dose was the exposure to asbestos and other dusts in terms of millions of particles per cubic foot (mppcf) times the duration of exposure. This exposure categorization is highly dependent upon the proportion of nonfibrous material in the aerosol being considered. Some relationships between particle counts and fiber concentrations in fibers longer than 5 micrometers per milliliter (f/ml) have been provided in the literature, but these are tenuous at best, based as they are upon a limited number of observations. Further, the study of Henderson and Enterline [1979] was limited to retirees over age 64 of a major asbestos products manufacturer in the United States. As was seen in Figure 2, observations of exposed groups begun late in life can differ considerably from those in which follow-up starts at younger years (as, for example, at age 40-45, 20 years after onset of employment). In the fourth study, that of Seidman et al [1979], exposure characterization involved the use of data from plants other than that in which the mortality experience occurred. A discussion of some of the differences of the slopes of the dose-response functions obtained in these studies has been made elsewhere [Nicholson, 1981a]. The important aspect is the linearity of effect with increasing amounts of asbestos inhaled.

In the analysis which follows, it is not necessary that one fully understand the reasons for the differences in the slopes of dose-response relationships in mining and various manufacturing operations as the relative risks in different industries will be based largely upon the observed mortality experience in those industries or upon a comparison of the number of cases of mesothelioma or excess lung cancers in different work activities. In this subsequent comparison, however, we will utilize a linear dose-response relationship to adjust for different periods of employment. While the evidence of linearity is strong for lung cancer, we will assume that it also obtains for mesothelioma and other malignancies. The evidence for this is more limited, but an analysis of the risks of mesothelioma according to time of employment in the study of Seidman et al would suggest that it is true for that tumor as well. For example, 0 of 215 deaths from mesothelioma occurred from less than 6 months exposure, 3 of 82 from 6 to 11 months exposure, 4 of 74 from 1 to 2 years exposure, and 7 of 63 from more than 2 years exposure.

Calculation of Asbestos-Related Mortality

As discussed previously, for those trades in which workers have possible asbestos exposure, estimates were made of the number of employees potentially at risk, the relative exposure of those workers compared with insulators, the average employment time of individuals entering a particular trade or industry, and the age distribution of new hires in the various trades or industries. The asbestos-related cancer mortality was calculated as follows. For those employees entering a trade subsequent to 1940, the above data from Table XII were utilized to obtain the number of new entrants into an industry during different periods of time. The age distribution of new manufacturing employees of 1960 (Table XXI) was used to calculate age-related mortality of new entrants into a trade or industry. This distribution also was found in new hires during 1974 at a major northeast US shipyard (E. Christian, personal communication). For each quinquennium at entry, the appropriate age, calendar year, and asbestos risk specific rates were applied to calculate the excess lung and other cancer mortality, the risk

of death from mesothelioma, the total mortality (based on US national rates for the entry quinquennium and all subsequent quinquennia until the year 2030 (assuming 1975–1979 rates to apply to the year 2030). This was done for each five-year period of entry, 1940–1980, and the calculated numbers summed for each calendar quinquennium, 1940–2030. For those employed in 1940, the appropriate age distribution for an industry or trade in 1940, as given by the US census, was used. For those employed in 1940, it was assumed that onset of asbestos exposure occurred at age 22.5 or 1930 for those 32.5 years or older in 1940.

The excess, nonmesothelial cancer mortality was calculated using the time dependence displayed in Figure 2 with the assumption that the manifestation of risk from a given exposure will first take place 7.5 years after its occurrence and increases linearly until 7.5 years after cessation of exposure. The risks of death from mesothelioma were calculated using the data of Figure 4, adjusted for each industrial group, with risk assumed to be constant after 45 years from first exposure. Account was taken of the different periods of exposure for each group in each decade, as indicated in Table XIII. Calculations were made using US white male rates. Some blacks and some women would have been employed in the industries under consideration, although their numbers would have been small. Were data available on the number of blacks and women, the use of black male rates would have increased the number of nonmesothelioma cancers and the female rates would have decreased the number, resulting in only a small change from these data.

The results of such calculations are shown in Table XXII through XXV, which list the average annual excess number of lung cancers, mesotheliomas, gastrointestinal, and other asbestos-related cancers, and total excess cancer attributable to asbestos exposure in each quinquennium from 1965 to 2030 for the populations in Table XII. In these tables the average annual mortality in each quinquennium is listed by the mid-year of the period. As can be seen, the dominant contributors to the asbestos-related disease are the shipbuilding and construction industries. Industries directly involved in the manufacturing of asbestos products or with the application of insulation material contribute a significantly smaller proportion to current asbestos disease and that to be expected for the next two decades.²

It is instructive to look at a display of the number of mesotheliomas and asbestos-related cancers in the shipbuilding industry from the year 1940 to the year 2000. While the total number of malignancies are necessarily uncertain, the data on the time course of the cancers that will occur are relatively good. These data are shown in Figures 5 and 6 for the populations first employed prior to 1940, during World War II, and subsequent to 1945. As can be seen, the relative importance of the wartime and postwar exposures are roughly equal, even though a considerably greater number of individuals were employed in World War II. This, of course, occurs because of the relatively short periods of work for the wartime group. Further, while the exposures in the construction industry are more uncertain, the important disease experience is also ahead of us in

²A preliminary report on this research has been presented elsewhere (W.J. Nicholson, G. Perkel, I.J. Selikoff, and H. Seidman. Cancer from occupational asbestos exposure: Projections 1980–2000. Banbury Report 9, Cold Spring Harbor Laboratory, 1981, pp 87–111). In that publication, an estimate was presented of the population at risk from asbestos exposure since 1940 (13,200,000) and projections of asbestos-related mortality (8,770 deaths in 1982 to 9,750 in 1990). The estimates of the population exposed to asbestos presented there, however, did not fully account for the extremely high turnover in workplace employment that we have discussed here. However, as the mortality estimates did not depend on the total population exposed, they are virtually identical to those presented here.

that industry, largely because of the extensive use of asbestos in spray fireproofing materials between 1958 and 1972. A measure of the overall future disease experience can be seen in Figure 7, which depicts the projected annual mesothelioma deaths from 1940 to the year 2000. Of all mesotheliomas that are estimated to occur between the years 1940 and 2000, about one third have occurred to date.

The number of mesotheliomas estimated by this procedure is approximately 40% greater than those that would be estimated to occur nationwide using data of the SEER program for white males during 1978 [R. Connelly, National Cancer Institute, personal communication, 1981]. Here, initial data (with one center not analyzed) report 98 mesothelioma deaths in nine of the ten SEER areas. As they represent approximately a

TABLE XXI. Age Distribution of Employees Hired During 1965 Who Were Not Working January 1, 1965*

Age	Number (in thousands)	Percent in age interval	Percent of shipyard workers in age interval ^a
18-19	892	15.1	17.8
20-24	1,614	27.3	31.6
25-34	1,431	24.3	27.6
35-44	861	14.6	12.0
45-54	588	10.0	6.1
55-64	361	6.1	2.9
65 +	146	2.5	0.0

*Data from Bureau of Labor Statistics [1965].

^aBased on 478 new hires during 1974. Data from Christian, Sec. Local 5, Industrial Union of Marine and Shipbuilding Workers of America (personal communication, 1981).

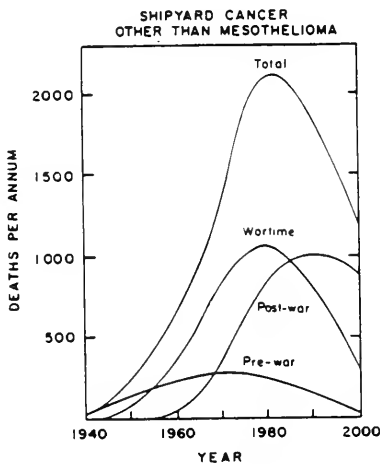


Fig. 5. The estimated and projected numbers of mesothelioma deaths per annum from past asbestos exposure from 1940 through 1999 among three groups of shipyard employees (those employed in 1940 or earlier, those employed during World War II, and those employed subsequent to World War II).

10% sample of the US population, the national estimate of cases for 1978 would exceed 1,000. This is to be compared with our estimate of 1,400 for the quinquennium 1976–1980 (and for the year 1978). In this comparison, however, it should be noted that the information used for the estimate of asbestos-related cancers in this work relied upon data that identified asbestos malignancy following analysis of all medical evidence and after a review of all pathological material available. The SEER program, on the other hand, used records-based reports with no review of pathological material. Experience has shown that pathological review will identify as mesothelioma many neoplasms initially categorized otherwise [Levine, 1978]. Further, while well representing the shipbuilding industry, the ten SEER areas underrepresent industrial areas and

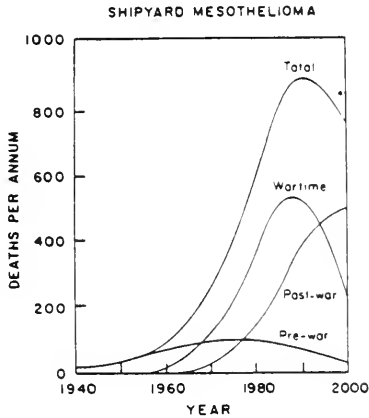


Fig. 6. The estimated and projected numbers of excess asbestos-related cancers per annum from 1940 through 1999 among three groups of shipyard employees (those employed in 1940 or earlier, those employed during World War II, and those employed subsequent to World War II).

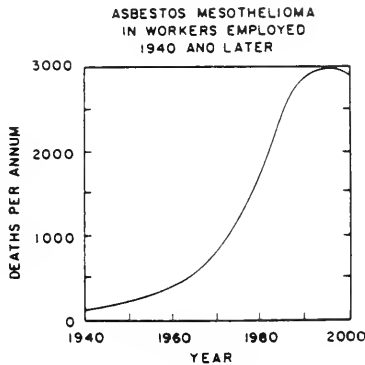


Fig. 7. The estimated and projected numbers of mesotheliomas per annum from 1940 through 1999 from occupational asbestos exposure.

TABLE XXII. The Projected Annual Excess Deaths From All Asbestos-Related Lung Cancer in Selected Occupations and Industries, 1967-2027

Industry or occupation	Number deceased in calendar year												
	1967	1972	1977	1982	1987	1992	1997	2002	2007	2012	2017	2022	2027
Primary asbestos manufacturing	129	189	240	270	288	284	260	224	173	122	77	43	20
Secondary manufacturing	146	192	261	321	374	387	377	343	291	228	160	102	56
Insulation work	158	235	319	379	418	421	390	333	299	185	119	68	35
Shipbuilding and repair	847	1,125	1,411	1,479	1,436	1,247	1,027	786	562	401	268	157	78
Construction trades	445	717	1,093	1,405	1,649	1,815	1,893	1,828	1,584	1,235	884	487	228
Railroad engine repair	66	79	88	84	62	55	36	19	8	2	0	0	0
Utility services	82	111	142	161	175	177	168	150	124	95	66	41	22
Stationary engineers and firemen	234	306	380	435	478	493	486	438	378	305	223	147	85
Chemical plant and refinery maintenance	116	163	209	246	267	270	254	224	181	136	93	56	30
Automobile maintenance	100	142	192	240	290	316	340	326	304	266	210	148	90
Marine engine room personnel	21	27	33	35	35	32	28	22	17	12	8	5	2
Totals	2,344	3,286	4,368	5,055	5,472	5,497	5,259	4,693	3,921	2,987	2,108	1,254	646

metropolitan regions that would have had significant construction activities 30 or more years ago. Thus, it is not unexpected that actual US rates may exceed those estimated from the SEER program.

There is observational evidence to support the analytical approach used in these calculations. The data for insulation workers suggest that 650 mesotheliomas and 2,300 excess lung cancers would occur between 1967 and 1976 among members of this craft. This is to be compared with 175 mesotheliomas and 380 excess lung cancers seen among insulators in the single union (The International Association of Heat and Frost Insulators and Asbestos Workers, AFL-CIO) studied by Selikoff et al [1979]. The ratios of 0.27 and 0.17 for the number of deaths among Asbestos Workers Union members to those calculated here is in reasonable agreement with the fraction of all insulators that the union has organized (0.29). The difference in lung cancer and mesothelioma ratios can be attributed to the fact that the insulators organized by this union are older than the entire group estimated to be at risk from 1967 through 1976 and, thus, have a proportionally greater risk of death from mesothelioma than from lung cancer compared to other insulators. Forty-two percent of the Asbestos Workers Union members were 45 years of age or older at the midpoint of the Selikoff et al study. A comparison of the ratios of the calculated 1977 mesothelioma deaths from industries (Table XXIII) with those observed in the study of McDonald and McDonald [1980] (Table XVI) also shows reasonable agreement.

As discussed previously, one third of those estimated to have had a potential exposure to asbestos were exposed for only a short period of time and were believed to have a risk less than that equivalent to that from employment in an asbestos products plant or as an insulator for two months. By calculating the person-years of exposure of the "lower risk population" and comparing the result to the total person-years of employment in each industry the contribution of the lower-risk group to the estimated excess mortality can be obtained. These results are shown in Table XXVI and indicate that 32% of the exposed group will contribute less than 2% of the excess asbestos-related deaths. The numbers are approximate because of uncertainties in the assumed short-term separating rate. They do, however, dramatize the consequences of inclusion of lower exposed individuals in the population at risk.

Asbestosis Deaths

The above estimates are of deaths from malignancy. There will be additional deaths from asbestosis that will occur in individuals exposed to high concentrations over long periods of time. In contrast to the asbestos cancers, deaths from asbestosis generally require considerable fiber exposure. They will largely occur in insulators, manufacturing workers and long-term shipyard employees. They will be fewer than the number of mesothelioma deaths among insulators (perhaps one half to three fourths). Because of the high labor turnover in manufacturing we would estimate that about one third as many deaths will occur from asbestosis as from mesothelioma. A similar ratio is probably appropriate for pre- and post-World War II shipyard workers (short-term wartime work would carry only a limited risk of death from asbestosis). Thus, approximately 200 deaths annually are now occurring from asbestosis (the condition, however, will be contributory to many more deaths). This number will perhaps double during the next two decades and decline thereafter.

TABLE XXIII. The Projected Annual Deaths From Asbestos-Related Mesothelioma in Selected Occupations and Industries, 1967-2027

Industry or occupation	Number deceased in calendar year													
	1967	1972	1977	1982	1987	1992	1997	2002	2007	2012	2017	2022	2027	
Primary asbestos manufacturing	56	64	80	102	128	149	160	161	147	123	89	59	34	
Secondary manufacturing	42	52	70	99	134	167	195	213	214	199	163	123	78	
Insulation work	51	65	91	130	173	207	227	229	209	157	128	86	50	
Shipbuilding and repair	292	386	542	612	884	865	770	659	541	409	287	201	120	
Construction trades	169	193	251	355	495	696	901	1,065	1,176	1,126	882	624	378	
Railroad engine repair	38	42	50	60	65	60	45	30	18	7	2	0	0	
Utility services	37	41	49	62	76	87	96	99	96	86	68	50	31	
Stationary engineers and firemen	120	125	148	168	207	238	259	262	247	214	165	117	71	
Chemical plant and refinery maintenance	46	55	70	91	117	138	149	152	145	128	99	71	44	
Automobile maintenance	40	48	60	78	100	122	148	172	190	200	190	158	108	
Marine engine room personnel	10	11	14	18	19	19	19	18	16	12	9	6	3	
Totals	901	1,082	1,425	1,775	2,398	2,748	2,969	3,060	2,999	2,661	2,082	1,495	917	

Comparison With Other Studies

Some previous estimates of asbestos-related mortality exceed those discussed here. In the Department of Health, Education, and Welfare estimate that 13%–18% of all cancers in the near future will be asbestos-related, recognition was taken that a large number of individuals were potentially exposed to asbestos, their estimate being 8–11 million compared with ours at 27.5 million, 18.8 million of whom had exposures greater than 2–3 f-yr/ml [Department of Health, Education, and Welfare, 1981]. However, their estimates of the number of heavily exposed individuals was subjective and no explicit adjustment was made for the different employment periods of exposed groups. The estimates by Hogan and Hoel [1981] that up to 12,000 deaths may occur annually from asbestos cancer placed great emphasis upon possible effects from the shipbuilding industry. They, too, subjectively estimated the number of heavily exposed individuals in this trade and did not explicitly account for variations in employment time and may have overestimated the asbestos-related mortality. However, their estimates of the effect of other industries neglected large numbers of individuals with potential exposure. Thus, their estimates for other than shipbuilding would appear to understate the asbestos disease potential [Nicholson, 1981b]. Finally, Blot and Fraumeni [1981] estimate that 120,000 lung cancer deaths will occur (over the population lifetime) from wartime shipyard employment. Our estimate is 25,000. The difference lies largely in our assigning a much lower risk to the very short term (< 1 year) employees.

A lower estimate of 4,000 asbestos cancers annually has been made by Higginson et al [1980] based upon mid-1970 SEER data for mesothelioma and a multiplier of three for other cancers. However, the multiplier depends on time from onset of exposure and population age and exceeded four during the 1970s. (Compare Tables XXII and XXIII.) Further, the previously mentioned limitations of the SEER data apply here. Enterline has also estimated that approximately 4,000 deaths will occur annually [Enterline, 1981]. He attributes 530 lung cancer deaths/yr to primary manufacturing and insulation work, 900 to secondary, 421 to shipyard employment, 212 to auto maintenance, and 438 for other occupations. In addition to lung cancer, he estimates 1,250 other cancers and 333 mesotheliomas will be asbestos-related. The values for primary manufacturing, insulation work, and auto maintenance are similar to our estimates and that for secondary manufacturing considerably more. However, much lower estimates are given for shipbuilding, construction, and other trades. This is in contrast with the finding that a much greater number of mesotheliomas occur in these trades compared with manufacturing and insulation work [McDonald and McDonald, 1980].

Expected Mortality in Asbestos-Exposed Workers

Tables XXII through XXV list the projections for the excess mortality associated with past asbestos exposures. For a given work category, these excess deaths will add to those expected in the absence of exposure but, with the exception of mesothelioma, an "excess" death cannot be distinguished from an "expected" one. As each of these deaths may lead to a claim for compensation or a third party suit, the potential of such cases can greatly exceed the number of excess deaths calculated above. For the heavily exposed (insulators, for example), where the excess deaths exceed those expected, the problem is not a great one. However, for groups with lesser exposure, the total number of lung cancer deaths that could be asbestos-related is very much greater than the numbers in Table XXII. Table XXVII lists the expected lung cancer deaths over the

TABLE XXIV. The Projected Annual Excess Deaths From All Asbestos-Related Gastrointestinal and Other Cancers in Selected Occupations and Industries, 1967-2027

Industry or occupation	Number deceased in calendar year													
	1967	1972	1977	1982	1987	1992	1997	2002	2007	2012	2017	2022	2027	
Primary asbestos manufacturing	52	59	65	73	78	77	71	60	47	33	21	12	6	
Secondary manufacturing	48	60	72	87	102	105	102	93	79	62	44	27	15	
Insulation work	57	74	87	103	114	114	106	90	70	50	32	19	9	
Shipbuilding and repair	313	354	384	402	390	339	279	214	153	109	73	43	21	
Construction trades	164	225	297	383	449	493	514	497	431	336	230	132	63	
Railroad engine repair	25	25	24	23	20	15	10	5	2	1	0	0	0	
Utility services	30	35	39	44	48	48	46	41	34	26	18	11	6	
Stationary engineers and firemen	80	96	103	118	131	134	130	119	103	83	61	40	23	
Chemical plant and refinery maintenance	43	51	58	67	73	74	69	61	49	37	25	15	8	
Automobile maintenance	36	46	52	66	80	86	90	88	82	72	58	40	24	
Marine engine room personnel	8	9	9	10	10	9	8	6	5	3	2	1	1	
Totals	856	1,034	1,190	1,376	1,495	1,494	1,425	1,274	1,055	812	564	340	176	

TABLE XXV. The Projected Annual Excess Deaths From All Asbestos-Related Cancer in Selected Occupations and Industries, 1967-2027

Industry or occupation	Number deceased in calendar year													
	1967	1972	1977	1982	1987	1992	1997	2002	2007	2012	2017	2022	2027	
Primary asbestos manufacturing	237	312	385	445	494	510	491	445	367	278	187	114	60	
Secondary manufacturing	236	304	403	507	610	659	674	649	584	489	367	252	149	
Insulation work	266	374	497	612	705	742	723	652	578	392	279	173	94	
Shipbuilding and repair	1,452	1,865	2,337	2,493	2,710	2,451	1,076	1,659	1,256	919	628	401	219	
Construction trades	778	1,135	1,641	2,143	2,593	3,004	3,308	3,390	3,191	2,697	1,996	1,243	669	
Railroad engine repair	129	146	162	167	147	130	91	54	28	10	2	0	0	
Utility services	149	187	230	267	299	312	310	290	254	207	152	102	59	
Stationary engineers and firemen	434	527	631	721	816	865	875	819	728	602	449	304	179	
Chemical plant and refinery maintenance	205	269	337	404	457	482	472	437	375	301	217	142	82	
Automobile maintenance	176	236	304	384	470	524	578	586	576	538	458	346	222	
Marine engine room personnel	39	47	56	63	64	60	55	46	38	27	19	12	6	
Totals	4,101	5,402	6,983	8,206	9,365	9,739	9,653	9,027	7,975	6,460	4,754	3,089	1,739	

years 1965-2030 (assuming 1978 rates for subsequent years). As can be seen, the expected numbers exceed the excess by nearly six times. Even if the 32% of individuals with lower exposure are excluded from consideration, the ratios of expected to excess range from 0.4 to 11.7.

Figure 8 shows the distribution of excess lung cancers expected between 1980 and 2030 according to equivalent insulator-years of exposure. (An insulator-year of exposure is that which would create the same risk as employment as an insulator for one year). The approximate exposure for a doubling of lung cancer risk is also indicated. Of the excess lung cancers, 50% occur in individuals with more than this doubling exposure. The total number of lung cancers is also shown for this group and is about 60% more than the excess due to asbestos exposure. For lesser exposures, the curve of the total cancer rises extremely steeply because of the large number of exposed individuals. At the peak of the asbestos related lung cancer curve, the total lung cancer curve would be four times higher. Parenthetically, the exposure distribution of mesothelioma cases will be similar to that of the excess lung cancers.

As mentioned previously at a given exposure level an "excess" death cannot be distinguished from an "expected" one. The problem, however, extends even across exposure levels. Many individuals with less than 5 insulator-years of exposure will have abnormal X-rays, and a significant percentage with greater exposure will have normal X-rays. This follows from the finding that more than 30% family contacts of

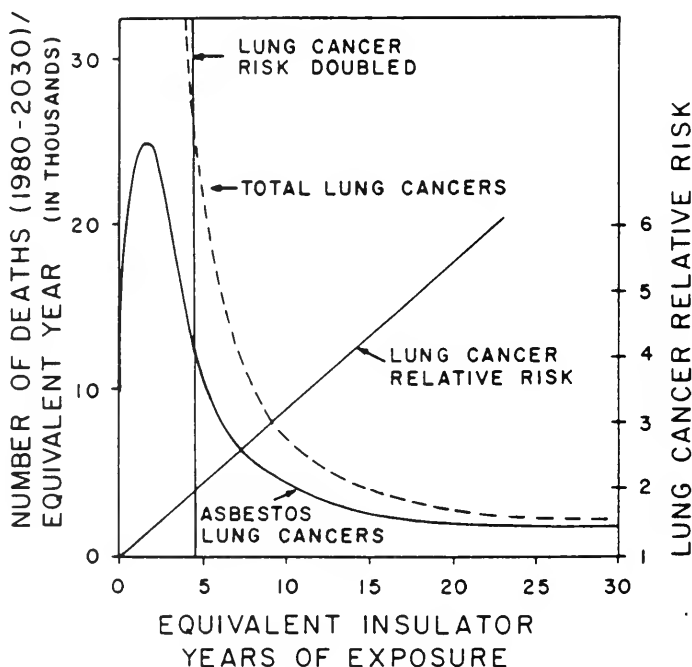


Fig. 8. The distribution of excess lung cancers expected between 1980 and 2030 according to equivalent insulator-years of exposure. (An insulator-year of exposure is that which would create the same risk as employment as an insulator for one year.)

TABLE XXVI. Percentage of Asbestos-Related Cancers That Occur Among Those With Lower Exposure Who Were Exposed After January 1940*

Industry or occupation	Percentage of deaths
Primary asbestos manufacturing	1.2
Secondary manufacturing	1.3
Insulation work	0.1
Shipbuilding and repair	1.9
Construction trades	1.0
Railroad engine repair	1.8
Utility services	0.8
Stationary engineers and firemen	1.8
Chemical plant and refinery maintenance	1.0
Automobile maintenance	12.4
Marine engine room personnel	2.3

*Lower exposure is considered to be less than 2-3 f-yr/ml. The overall contribution to mortality of all individuals with lower exposure is 1.9%.

asbestos factory workers (Anderson et al. 1979) and insulators (Nicholson et al. to be published) have asbestos related X-ray abnormalities (20-30 years after onset of less than 5 equivalent years of exposure) and that a fair number of insulators with 20 or more years in the trade have normal X-rays. Pulmonary function tests are even less revealing. While procedures based on exposure or on clinical evidence of exposure are possible, the allocation of compensation resources to the deserving individuals is clearly an enormously difficult scientific problem. It is an even more difficult social problem.

CONCLUSIONS

Estimates have been made of the numbers of cancers that are projected to result from past exposures to asbestos in a number of occupations and industries. Only those potentially exposed by virtue of their employment have been considered. Additional deaths will result from exposure among family contacts (household contamination), from environmental exposures, from exposure during consumer use of asbestos products, and from exposure while in the Armed Forces, particularly in engine rooms of naval ships. No estimates have been made of deaths resulting from asbestosis. These estimates indicate that:

1. From 1940 through 1979, 27,500,000 individuals had potential asbestos exposure at work. Of these, 18,800,000 had exposure in excess of that equivalent to two months employment in primary manufacturing or as an insulator ($> 2-3$ f-yr/ml). 21,000,000 of the 27,500,000 and 14,100,000 of the 18,800,000 are estimated to have been alive on January 1, 1980.
2. Approximately 8,200 asbestos-related cancer deaths are currently occurring annually. This will rise to about 9,700 annually by the year 2000.
3. Thereafter, the mortality rate from past exposure will decrease but still remain substantial for another three decades.

TABLE XXVII. Expected Lung Cancer Deaths in Selected Occupations and Industries, 1967-2027

Industry or occupation	Number deceased in calendar year													
	1967	1972	1977	1982	1987	1992	1997	2002	2007	2012	2017	2022	2027	
Primary asbestos manufacturing	230	327	435	528	604	646	642	588	499	400	308	238	186	
Secondary manufacturing	424	628	870	1,100	1,297	1,446	1,518	1,497	1,394	1,237	1,047	833	605	
Insulation work	67	97	132	162	187	204	210	203	187	164	138	109	79	
Shipbuilding and repair	4,420	5,956	7,550	8,694	9,202	8,553	7,541	5,522	3,595	2,188	1,478	1,144	800	
Construction trades	2,501	3,793	5,325	6,761	8,033	9,061	9,648	9,677	9,173	8,246	7,005	5,536	3,942	
Railroad engine repair	258	334	404	441	451	421	350	248	143	62	17	20	0	
Utility services	316	438	572	684	770	819	827	764	672	566	461	358	256	
Stationary engineers and firemen	1,703	2,316	2,969	3,491	3,895	4,114	4,080	3,769	3,253	2,660	2,082	1,557	1,075	
Chemical plant and refinery maintenance	736	1,026	1,139	1,576	1,791	1,881	1,870	1,715	1,474	1,205	948	716	504	
Automobile maintenance	2,761	3,969	5,358	6,592	7,572	8,231	8,450	8,172	7,543	6,894	5,731	4,646	3,436	
Marine engine room personnel	177	236	295	337	361	363	338	288	231	176	133	97	64	
Totals	13,593	19,120	25,049	30,366	34,136	35,739	35,374	32,443	28,164	23,798	19,398	15,236	10,947	

These projections are from past exposures to asbestos. Over one million tons of *friable* asbestos material are in place in buildings, ships, factories, refineries, power plants, and other facilities. The maintenance, repair and eventual demolition of these facilities provide opportunities for continued significant exposures. If such work is not properly done, or if asbestos is otherwise used with inadequate controls, the burden of disease and death from past exposures will be increased by the environmental exposures of the future.

ACKNOWLEDGMENTS

This work has benefited from the critical review and suggestions of Thomas C. Brown, Fred Siskind, and Howard Vincent of the Department of Labor. Support for this research was provided by Contract J-9-M-8-0165 of the Department of Labor and Center Grant ES00928 of the National Institute of Environmental Health Sciences.

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DEMETRIUS I. PLESSAS

Benefits and Costs of the Federal Asbestos Standard

by

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To be Presented At a Department of Labor Conference
on

"Evaluating the Effects of the
Occupational Safety and Health Program"

March 18-19, 1975
Annapolis, Maryland

Sponsored by:

Office of the Assistant Secretary for
Policy, Evaluation and Research
and
Occupational Safety and Health Administration
U.S. Department of Labor

BENEFITS AND COSTS OF THE FEDERAL ASBESTOS STANDARD

by

Russell F. Settle*

I. Introduction

The social consensus in the United States has held for many decades that the safety and health of workers should not be determined entirely by the workings of unconstrained markets. State occupational safety and health laws date from an 1877 Massachusetts statute regulating certain hazardous parts of machinery (Page and O'Brien, p. 53). Most state workmen's compensation laws¹ extend back more than half-a-century. The first state workmen's compensation legislation was passed in 1911, and by 1920 all but six states had adopted at least limited no-fault approaches to compensating workers for work-related injuries (NCSWCL, p. 34).

The federal government's interest in controlling occupational safety and health hazards dates at least from the passage of railroad safety laws beginning in 1893 (Page and O'Brien, p. 54). In 1908 Congress passed the country's first workmen's compensation laws, although these acts applied only to railroad employees engaged in interstate commerce and to certain federal employees (NCSWCL, p. 34). In 1936 Congress passed the Walsh-Healey Act which, in part, authorized the promulgation and enforcement of safety and health standards for firms working under contracts to the Federal government exceeding ten thousand dollars. Federal authority over the work conditions in the private marketplace was extended even further in the 1960's with the passage of the McNamara-O'Hara Act of 1966--which lowered the ten

thousand dollar contract minimum to twenty-five hundred dollars-- and the Construction Safety Act of 1969, which extended control to firms with federally funded or assisted construction contracts. With the passage of these laws, over 30 million non-federal employees, or about 40 per cent of the civilian non-federal labor force, were at least nominally protected by federal occupational safety and health (OSH) standards² (Page and O'Brien, p. 94).

The culmination of this trend toward greater and greater contravention of private decisions regarding occupational safety and health was the passage of the federal Occupational Safety and Health Act of 1970,³ which extended federal authority in this area to cover all firms engaged in interstate commerce.⁴ The federal government's policy, as stated in the OSH Act of 1970, is ". . . to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources."⁵

The need for these governmental interventions was supposedly obvious.⁶ Nevertheless, little is known about the ~~advantages (benefits), and disadvantages (costs)~~ of governmental regulation of work hazards. This paper (1) develops a conceptual framework for evaluating the benefits and costs (in the narrow efficiency sense of these terms) of governmental intervention in private OSH decisions, and (2) applies this methodology in an illustrative quantification of the benefits and costs of the federal asbestos standard.⁷

II. Benefits and Costs of Improving OSH

In this section, we develop a taxonomy of the "benefits" and "costs" of governmental intervention to improve OSH. In the following

sections, the operational form for a number of benefits and costs is discussed, with attention focused on the effects of the federal asbestos standard.

Benefits of Governmental Intervention

Efficiency gains from governmental intervention in private OSH decisions take a number of forms. First we identify the forms of intervention benefits. As will become clear in the following sections, a number of these benefits are, unfortunately, not amenable to quantification given the present state of benefit-cost analysis. Nevertheless, it remains important at least to identify all benefits (and costs) so as to place those that are quantifiable in perspective.

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Ideally, we would like our measures of the gross benefits from improved job safety and health to capture all of those elements which, in combination, equal the sum of all individual willingnesses-to-pay for such improvements.

1. One obvious form taken by the efficiency gains from job safety and health improvements is the increase in present and future production by those who, in the absence of governmental intervention, would have had their productivity temporarily or permanently reduced by a job-related illness or injury.⁸ Conceptually, these productivity gains refer to both market and non-market activities as a disabled worker will generally contribute less in his role as a producer both on and off the job.

Some studies treat the productivity gains from better health (and safety) as the savings in output minus the consumption of those who, without the health (or safety) improvements, would have died; that is,

"... 'society' is so defined as to exclude the individual whose life is being valued..."⁹ In this study, however, we are attempting to approximate society's willingness-to-pay for improvements in job safety and health, where the "society" includes those who, without the improvements, would be killed. Thus, we are interested in the total-contribution to output (i.e., unadjusted for the individual's own consumption) by those whose lives are saved.

Furthermore, these productivity measures conceptually encompass all those who would have been disabled in the absence of collective action, including non-workers or "third parties" to whom OSH hazards represent an externality.

2. These productivity gains no doubt capture only a part of an individual's willingness-to-pay for increased protection from work hazards, as there is presumably more to life than what is purchasable with the income from work. That is, individuals surely enjoy pure consumption benefits from an existence unhampered by work disabilities. To claim otherwise would be to say that those who do not work--the retired, the wealthy, even the chronically unemployed--would be willing-to-pay nothing for continued good health and well-being, in fact, for continued existence--surely an untenable position. Thus, we would ideally like to include in our benefit estimates some measure of the consumption value of improved OSH.

As will be apparent in the asbestos study, the inclusion of such a broad measure is particularly desirable (although nonetheless difficult to accomplish) when evaluating the benefits of controlling health hazards which, due to long delays between exposure and illness,

affect many of their victims only after retirement. Prospects for quantifying this component of willingness-to-pay are discussed further in a following section.

3. A third potentially important component of a social willingness-to-pay for improved OSH is the value of the resources that otherwise would have been used in the detection, treatment, and rehabilitation of work hazard victims.¹⁰ The quantity and types of such resources used will, of course, vary considerably, depending upon the particular injury or illness under consideration. For example, injuries may generally require little by way of detection, whereas health problems (e.g., occupationally-related cancers), if they are to be found in time for treatment, may be detectable only at great expense.

4. Reductions in work injuries and illnesses may also be valued for the resources released from the administration of workmen's compensation and other insurance.¹¹ Again, the quantity of resources freed will vary greatly according to types of disability. Injured workers normally receive workmen's compensation, for example, while workers with certain occupational diseases (e.g., cancers caused by agents not known to be carcinogenic) may not receive compensation because of the generally inadequate coverage of occupational diseases by many state workmen's compensation laws.¹²

5. Work-related disabilities may occasion the training of personnel to replace those disabled. To the extent that improvements in OSH reduce the need for replacement personnel, these training resources would be freed for alternative uses, and, thus, should be accounted for in our approximation of social willingness-to-pay

for better OSH.

6. The presence of work hazards may lead to efforts by workers to avoid them, to keep from being injured or sickened. These efforts could take such forms as simply being more careful, wearing protective equipment or clothing, etc. In addition, they may cause employers to take steps to protect their workers, as would generally be the case when workers demand risk premiums for "hazardous" jobs. Government intervention, say, with OSH standards specifying the precise manner in which a particular OSH hazard is to be reduced or eliminated may well substitute for these private efforts, thereby freeing additional private resources, and perhaps making workers, who now need expend less time and energy at being careful, more productive. Such outcomes, if they occur, should be valued and included in our measurement of gross benefits from government intervention.¹³

7. There are several other forms of losses, termed here "psychological losses," arising from work-related injuries and illnesses, which those suffering such losses would no doubt be willing to pay to avoid, and which, therefore, should ideally be accounted for in an evaluation of the benefits from improved OSH. These forms include those losses arising from (a) the pain and suffering attendant in work-related injuries and illnesses, including any embarrassment and anguish from disfigurement, loss of limb, etc., and (b) risk aversion among those who stand to suffer a probabilistic loss from the existence of work hazards.¹⁴

8. Governmental intervention to improve OSH may also benefit owners of capital inasmuch as it prevents or reduces damages not

only to workers, but also to the stock of capital. For example, OSH standards designed to protect against fires or explosions will confer benefits on the owners of capital to the extent that damage to capital is reduced. Clearly, these benefits may, or may not, be less than the costs imposed on capital-owners by the standard. For instance, firms or capital-owners may have done their own protecting against fires, etc., and thus, they may oppose interventions that require changes. In any event, it is conceptually necessary to include these effects in our benefit measures, since (as will be clear shortly) our cost measures include the corresponding intervention costs. It should be noted, however, that increased protection of workers could, conceivably, diminish the protection afforded capital. If so, these additional losses in damaged capital would be counted as a cost of the intervention.

9. Finally, governmental efforts to reduce OSH hazards may confer benefits on the firm (or the owners of the firm) as improvements in OSH may reduce absenteeism related to job injuries or illnesses, reduce the number of work-stoppages and slowdowns caused by accidents, and, possibly, improve the overall morale and productivity of the work-force.

As in the capital-damage case, it is clear that these benefits to the firm may, or may not, be less than the cost of the intervention to the firm. If the firm has already taken advantage of all profitable opportunities to reduce OSH hazards, they will presumably oppose OSH standards that require changes or additional expenditures. Nevertheless, it is desirable to include measures of these "desirable" effects of the standard in our benefit

quantifications since the corresponding costs are included in our cost calculations.

The major components¹⁵ of a social willingness-to-pay for governmental intervention to protect workers from any particular job-related injury or illness depend upon:

- (a) The present and future productivity of those who otherwise would have been disabled;
- (b) The extent to which the disability affects one's present and future capacity to enjoy "leisure" (i.e., consumption or non-work activities);
- (c) The magnitudes of detection, treatment, and rehabilitation expenditures occasioned by the injury or illness;
- (d) The value of the resources expended in the administering of workmen's compensation or other insurance claims occasioned by the disability;
- (e) The extent of attempts to avoid, reduce, or prevent work hazards prior to the intervention;
- (f) The extent of "psychological losses" occasioned by disability, or the anxiety occasioned by the fear of disability;
- (g) The hazard-related losses (if any) to the firm and to the owners of capital.

Social Costs of Governmental Intervention

In this section, we identify a number of social costs likely to accompany governmental intervention in the market's provision of OSH. It is these social costs which must be offset against the

social benefits noted above to determine whether a "potential market failure" is, in fact, an actual market failure. If the benefits exceed the costs, the intervention would enhance efficiency; otherwise, it would not. That is not to say, of course, that intervention should not be undertaken if the efficiency costs exceed the efficiency benefits; it may be that an inefficient intervention advances society toward some equity goal and thus, is considered, on balance, "worthwhile." (The reverse may also be true; i.e., an efficient intervention may give rise to such inequities as to be considered "undesirable" by policymakers.)

1. One obvious social cost occasioned by intervention is the cost of compliance, where by "compliance costs" we mean the present and future real resource expenditures on improvements in OSH (i.e., reductions in OSH-hazards) necessitated by the law, e.g., by an OSH standard. Examples of compliance costs are expenditures occasioned by an intervention on protective equipment or clothing, on exhaust fans to reduce the level of noxious gases or dust-contaminated air in a working area, and on safety training. By contrast with these real costs, tax payments under a tax-subsidy regime or financial penalties for violations of the law, while no doubt viewed by the firm as a cost of compliance, are seen here as financial transfers¹⁶ and are, thus, omitted from consideration.

2. Additional resources will be expended in the establishment and enforcement of regulations governing OSH. Expenditures of resources are generally necessary in the establishment of regulations, be they tax rates on various levels of a hazard or direct controls over that hazard, as little may be known initially, even

among the "experts," about alternative methods for abating hazards, or about the likely effects of a hazard--particularly a health hazard--on the well-being of those exposed to it. That regulations are not costlessly established is illustrated by the facts that (1) in fiscal 1973 the Occupational Safety and Health Administration (OSHA), the federal agency responsible for administering the OSH Act of 1970, expended approximately \$3 million on the development of safety and health standards,¹⁷ and (2) in fiscal 1972 the National Institute for Occupational Safety and Health, OSHA's medical research arm, spent about \$25 million on research to provide information for the establishment of OSH standards.¹⁸

2. The most important component of the public sector resources expended as a consequence of the government's intervention, however, is the cost of enforcement, including the costs attendant to inspection--to determine if violations have occurred--and adjudication--to prosecute violators. In fiscal 1973 OSHA spent in the neighborhood of \$23 million on enforcement of OSH standards (primarily for inspection)¹⁹ while the Occupational Safety and Health Review Commission (OSHRC), a special court for hearing cases brought under the OSH Act of 1970, expended about \$1.3 million to adjudicate the cases brought before it.^{20, 21}

In addition to these public sector expenditures, there are private sector expenditures related to the establishment and enforcement of OSH regulations. Firms, trade organizations, unions, and other interested parties may expend resources in efforts to make their views known as regards, say, the proposed stringency of a particular standard. In addition, private parties or organizations,

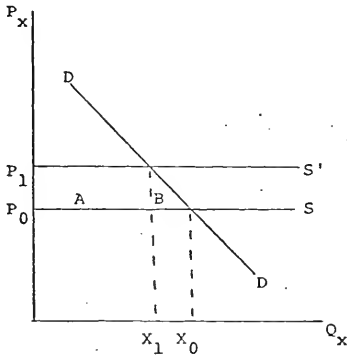
e.g., firms or unions, may direct resources into legal battles in expectation of obtaining favorable court rulings. The cases heard by OSHRC have at least one private party of organization as either the plaintiff or the defendant.²² Ideally, an evaluation of any particular intervention (e.g., a particular OSH standard) should account for all of these various forms of public and private sector expenditures occasioned by the establishment and enforcement of the OSH regulation.

3. Governmental intervention in the market's provision of OSH will, unless all compliance costs to the affected firms are completely subsidized or shifted backward into the factors of production, increase production costs and, eventually, the price of the goods or services produced by those firms. This process is illustrated in Figure 1 for a competitive industry producing some good, X. The intervention, say, in the form of OSH standards, increases the per unit cost of production, taken to include both fixed and variable costs, and hence price in this competitive industry from P_0 to P_1 . In response to the higher price, consumers reduce quantity demanded from X_0 to X_1 . Relative to the initial equilibrium, consumers are worse off in the post-standards equilibrium by the amount $(A + B)$, i.e., by the decrease in consumers' surplus.

However, only part of this consumers' surplus loss should be counted as a social cost of the intervention. To see this, suppose that production relations in competitive industry X are fixed coefficients. If this assumption is granted, then the OSH standard will increase per unit production costs (and eventually output price) by precisely the average compliance cost per unit of output (e.g.,

Figure 1

Consumers' Surplus Loss Caused by OSH Standards



by $P_1 - P_0$ in Figure 1). Consequently, area A in Figure 1 is exactly equal to the compliance costs nominally borne by the firms in industry X. That is, the compliance costs are shifted from producers of X to consumers of X. Since this shifting of costs represents a transfer, to include compliance costs (area A) a second time as a loss in consumers' surplus would involve a double-counting of compliance costs. Area B, on the other hand, represents a consumers' surplus loss not counted elsewhere. Thus, it is legitimately included as an intervention cost.

4. Generally, benefit-cost analyses assume that the productive resources released when output is reduced (e.g., from X_0 to X_1 in Figure 1) immediately move into alternative and equally productive

activities.²³ This assumption is not, however, maintained in this study. While it seems plausible that resources do find their way into alternative and equally productive activities, it is implausible that they do so immediately and costlessly, without an intervening period of unemployment.²⁴ Consequently, this study takes as its final intervention cost the value of production lost during the period of transitional unemployment.²⁵

To summarize: There are four potential forms of intervention costs, all of which are, fortunately, susceptible to some degree of quantification. In general, the costs of any particular intervention are seen to depend upon:

- (1) The value of the resources expended on improving OSH;
- (2) The public and private sector expenditures related to the establishment and enforcement of the OSH regulations;
- (3) The extent of consumers' surplus losses (not elsewhere counted);
- (4) The extent and duration of resource unemployment caused by the intervention.

In the next section an approach to operationalizing this benefit-cost framework is demonstrated through an illustrative evaluation of the asbestos standard. In this case study we are able to quantify, to some extent, all of the costs and a number of the benefits identified above.

Part II

III. Benefit-Cost Measurements

In this section, we operationalize a number of the benefits

and costs of governmental OSH intervention in an illustrative evaluation of the federal asbestos standard. Before discussing our approach to measuring these various effects of the standard, we briefly indicate the salient features of (1) the asbestos dust hazard and (2) the asbestos standard.

The Hazard

Exposure to airborne asbestos dust may cause any one of a number of serious, and largely fatal, diseases. There seems to be some consensus among medical "experts" that occupational exposure to dust concentrations of no more than 2 asbestos fibers per cubic centimeter of air would lead to a negligible number of asbestos-related illnesses.²⁶ Average dust concentrations encountered by the occupational groups exposed to asbestos dust may be at least 5-6 fibers per cubic centimeter.²⁷

There are two occupational groups directly exposed to airborne asbestos dust: (1) workers in the asbestos-products industry,²⁸ and (2) asbestos insulation workers (see NIOSH). In addition, construction workers in general may encounter airborne asbestos dust generated by the activity of the insulation workers (see NIOSH).

As a result of the exposure to asbestos dust, these workers run increased risks of developing any of several diseases, including lung cancer, stomach cancer, colon-rectum cancer, cancer of the esophagus, pleural mesothelioma (a rare lung cancer), peritoneal mesothelioma (a rare stomach cancer), and asbestosis, an irreversible lung disease caused by the scarring of lung tissue with asbestos fibers; it progressively reduces the ability of the lungs to take in oxygen (Selikoff(1969)). An important feature of this asbestos hazard is

(Asbestos dust is a carcinogen)

the remarkable period of time usually required for these diseases to develop after the initial exposure. Seldom, if ever, do asbestos-induced diseases occur within 10 years of the onset of the exposure. The average time lag between initial exposure and appearance of the disease is at least 30 years (Selikoff (1972)).

The Standard

The federal asbestos standard, promulgated by OSHA in 1971, "requires" that by 1975 firms control airborne asbestos dust so that no worker is exposed to more than 2 asbestos fibers per cubic centimeter of air, determined as a time-weighted average exposure for an eight-hour day.²⁹ Until 1975, dust concentrations are restricted to 5 fibers per cubic centimeter of air. While it is unlikely that asbestos-induced diseases will be completely eliminated by a 2-fiber standard, they may be reduced to a negligible number, provided the standard is vigorously enforced. In the estimation of benefits and costs, we assume that the number of asbestos-induced diseases occurring under a 2-fiber standard will be so negligible that they can be ignored. Thus, in the following empirical work, our quantifications are based on the assumption that a 2-fiber asbestos standard will eliminate asbestos-induced diseases. *assumed no exposure expected for a certain generation of workers*

The Benefits and Cost Quantified

In evaluating the economic effects of the asbestos standard, it was found feasible to quantify, to some extent, all of the social costs discussed above: (a) compliance costs, (b) enforcement costs, (c) consumers' surplus losses, and (d) unemployment costs. Measures of several forms of social benefits were also constructed, including measures of (a) money income gains from reduced morbidity and mortality,

(b) savings in treatment resources, and (c) non-market productivity and consumption gains from reduced morbidity and mortality.³⁰ Our measures of these effects are discussed below. In particular, in the remainder of this paper we (1) highlight the more restrictive, and controversial, assumptions made in constructing measures of these benefits and costs, and (2) summarize the empirical results of our study.

Market Productivity Gains From Eliminating Premature Deaths

Market productivity gains from eliminating asbestos diseases are estimated with the conventional measure: the present value of the production contributed (i.e., income earned) by those who, in the absence of the standard, would have died from an asbestos disease. In computing this measure, we used approximate sex-age-income profiles for the occupations at risk,³¹ adjusted to allow for (a) growth in labor productivity (taken to be 1.6 per cent per annum), (b) potential unemployment (we used a 3 per cent unemployment rate), and (c) the possibility of death from other causes (standard mortality rates were employed).³² These earnings streams (and all other time streams) were discounted with rates of 4 and 10 per cent.

ESTIMATION OF THE NUMBER OF PREMATURE DEATHS. To estimate the productivity gains from reduced mortality from asbestos disease, we also needed data on the annual number of asbestos-induced deaths. Unfortunately, these data were not available, and consequently had to be developed.

In a 5-year panel study of 17,800 insulation workers, Selikoff, et al. (1972) observed 537 deaths (144 were expected) from diseases that could have been caused by exposure to asbestos. Under the

assumption that all of the difference between observed and expected deaths can be attributed to asbestos exposure, the implied annual number of asbestos-caused deaths per 1,000 insulation workers is about 4.4. Since there are about 40,000 insulation workers in the U.S. (see NIOSH), our estimate of the number of asbestos-related deaths occurring annually among insulation workers is 176 ($= 4.4 \times 40$).

Data obtained from the American Cancer Society on asbestos-related diseases among two cohorts of insulation workers and two cohorts of asbestos products workers suggest that death rates for asbestos-related diseases are approximately the same for both occupational groups. Since there are roughly 50,000 asbestos products workers (see NIOSH), this rate implies about 220 asbestos-caused deaths per year among the products workers.

The remaining group at risk is construction workers, and obtaining any sort of reliable estimate for this group poses substantial problems since no studies of the incidence of asbestos diseases among construction workers have apparently been undertaken. We obtained an undoubtedly crude estimate of the number of such deaths as follows.

Public Health Service estimates of the number of deaths from lung cancer--an important asbestos-related disease--among construction workers in 1950 put the actual number at 1195 deaths and the expected number at 879 deaths. Adjusted for increases in the number of construction workers and for increases in lung cancer death rates, these estimates imply an upper bound estimate of 728 asbestos-linked lung cancer deaths among construction workers in 1970.

To translate this figure into an upper bound estimate for

deaths from all forms of asbestos diseases, we employed the ratio of (1) the number of deaths from all forms of asbestos diseases to (2) the number of deaths from lung cancer attributable to asbestos exposure implicit in the Selikoff study (1972); namely, 1.67. This approach suggests that (at a maximum) the total number of deaths from asbestos diseases among construction workers in 1970 is 1216. As this estimate is clearly imprecise and crude, we also employed some alternative assumptions in our quantifications; namely, that the actual number of such deaths is, alternatively $\frac{1}{2}(1216)$, or 0.

The age distribution of these asbestos-induced deaths was estimated from American Cancer Society panel data on the deaths, by age, from selected diseases caused by exposure to asbestos dust.

ESTIMATES OF ANNUAL PRODUCTIVITY GAINS FROM REDUCED MORTALITY. Based on these assumptions, we obtained the following estimates of annual market productivity gains. At a 4-per cent rate of discount, the expected annual gain, assuming 608 construction workers deaths, was estimated to be \$55 million in prices around 1970; alternative assumptions about the number of construction worker deaths produced estimates of \$23 million and \$86 million annually. At a 10-per cent rate of discount, our estimate of the income gain was \$41 million, bracketed by \$17 million and \$65 million.

Morbidity Losses from Asbestos Diseases

To calculate the economic value of morbidity losses, we need, in addition to the earnings profiles estimated below, estimates of (1) the number of workers, by age, sex, and occupation, afflicted annually with asbestos diseases, and (2) the average disability

period for these diseases.

As an estimator of (1), the number of workers disabled, we employed the product of (a) the number of workers dying annually from asbestos diseases, and (b) the ratio--assumed stable--of new cases of asbestos diseases to deaths from such diseases. Estimation of the number of deaths was discussed above. We approximated (b), the ratio of new cases to deaths, with data on the entire U.S. population (see Axtell, and also Cancer Facts and Figures, 1971, American Cancer Society). The overall ratio was estimated to be around 1.17, implying that about 1175 (\pm 711) new cases of asbestos diseases occur annually among exposed workers.

As an estimator of (2), the average disability period, a weighted average of the median survival times for individual asbestos diseases was employed (see Axtell). The weights were the proportions of all new cases due to a particular asbestos disease. These data imply a (weighted) average disability period of approximately 12 months.

Based on these assumptions, the estimated annual income losses from asbestos-induced morbidity is about \$8.9 million (\pm \$5.2 million). These losses were not discounted due to the relatively short time period involved.

Savings in Detection, Treatment, and Rehabilitation Resources

The estimator of the annual value of this social benefit that we employed is the product of (1) the present value of the average treatment costs per asbestos-related illness, and (2) the annual number of such illnesses.

Average treatment cost per illness is taken to be a weighted

average of the treatment costs for the individual diseases, where the weights--the proportion of all new cases attributable to a particular disease--reflect the relative frequencies with which the various diseases occur. The data used to compute the expected treatment cost per case are shown in Table 1; they imply an expected treatment cost per case of around \$3,120 in 1970 prices.

The second component of the estimator of total treatment costs is the number of cases of asbestos disease. Since we estimated the number of cases among workers above, we need only consider the number of new cases among retirees. American Cancer Society data reveal about 59 retiree illnesses from asbestos-related diseases for every 100 such illnesses among workers, suggesting that the annual number of retiree illnesses would be around 693 (\pm 420).

These data imply a measure of about \$5.8 million (\pm \$3.6 million) as the annual social value of freeing these treatment resources for other uses.

Non-Market Gains Among Workers

Presumably, individuals have a willingness-to-pay for increases in both market and non-market productivity--broadly defined to include non-market "work" and leisure activities. Consequently, these non-market gains should, ideally, be quantified and included as a benefit of reduced mortality and morbidity.

In principle, the value of non-market time (i.e., production) at the margin is just equal to the value of market time (i.e., the net wage rate). While there are, in practice, some difficulties with this measure of marginal non-market time (e.g., a standard 40-hour workweek may hinder the equating of marginal time values

Table 1

Data Used in Computing Treatment Cost Per Case of Asbestos Disease

Asbestos Diseases	Hospital Cost, Per Case	Cost of Physicians' Services, Per Case	Other Treatment Costs, 1 Per Case	Total Treatment Costs, (2)+(3)+(4) 2	Weights: Proportion of all New Cases
(1)	(2)	(3)	(4)	(5)	(6)
Lung Cancer	\$2,565	\$250	\$210	\$3,025	.400
Colon-Rectum Cancer	3,470	325	285	4,080	.028
Stomach Cancer	2,680	300	220	3,200	.020
Other Cancers	2,560	245	210	2,950	.172
Cancer of the Esophagus ³	-	-	-	3,025	.028
Peritoneal Mesothelioma ³	-	-	-	3,025	.111
Plural Mesothelioma ³	-	-	-	3,025	.060
Asbestosis ³	-	-	-	3,025	.172

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¹Other treatment costs include nursing home costs, nursing services, and drug costs.

²The sum of (2), (3) and (4) may not equal (5) due to rounding.

³Assumed to entail the same treatment costs as lung cancer

Source: Data: Our calculations based on data in Economic Costs of Cardiovascular Diseases and Cancer, 1962 DHEW, 1965.

for different activities), we employ it as at least a rough proxy for the value of non-market time. Of course, even in principle the values of time in alternative uses are equated only at the margin; consequently, valuing all non-market time at the wage rate establishes, in principle, only a lower bound estimate for the true value of non-market time (obviously, the same criticism also applies to valuing all market time at the wage rate).

This measure was operationalized as follows: Non-market productive time per year, per individual was defined as the difference between (1) total productive time available and (2) time spent at market work (2000 hours). Since a certain part of each individual's day must be spent in maintenance activities (e.g., to satisfy minimal sleep requirement), total productive time available will clearly be less than total time in a year (8766 hours). We took 6 hours a day as a reasonable proxy for average time required for minimal maintenance activities. This assumption leaves 4574 hours on average for non-market activities; that is, 2.28 times the number of hours used in market work. Thus, our measure of the private value of non-market time is 2.28 times the private value of market time.

Annual money income represents the social value of market time for a year, but these figures have to be adjusted for taxes to estimate the private value of market time. The average tax on market earnings was taken to be about 20 per cent for the income classes considered here.³³ Thus, our lower bound valuation, T , for the annual non-market time of an individual is:

$$T = (2.28) \times (.80) \times (\text{annual money earnings}).$$

If this approach is at all reasonable, the present value of on-market productivity gains to workers from the prevention of premature mortality from asbestos diseases would be about \$104 million annually at a 4 per cent rate of discount (bounded by \$32 million and \$123 million).

Applying the same methodology to morbidity losses, produces an additional gain of \$16.9 million annually for workers (with bounds of \$7.0 million and \$26.6 million).

The Willingness-to-Pay of Non-Workers

Since about a third of those who are affected by asbestos diseases are non-workers (i.e., retirees), it would clearly be useful to have some measure of the willingness-to-pay for retirees for improved health. Conceptually, one need not distinguish between the willingness-to-pay of workers and non-workers. However, the distinction becomes necessary in practice when one employs market earnings to approximate workers' willingness-to-pay because, with the exception of the semiretired, retirees have no market earnings.

One approach to estimating the willingness-to-pay of retirees is to use consumption expenditures as a proxy for willingness-to-pay. This measure seems, however, to be irrelevant from the viewpoint of economic efficiency (i.e., social willingness-to-pay). Consider, for example, an individual with only transfer income (e.g., Social Security payments). When this person dies, the income transfers cease, thereby benefiting, by the amount of the transfer, those whose incomes would have been reduced to pay it. Consequently, from a narrow economic efficiency stance, the consumption benefits to the individual must be reduced by the amount of the transfer income he

receives, including income from his own accumulated wealth, to reach social willingness-to-pay. Ignoring interdependent utility losses, this approach suggests that the net social willingness-to-pay to prevent the death of an individual whose income consisted entirely of interest or transfer payments is zero.

An alternative approach (and the one taken here) to estimating the economic gain to a retiree from improved health is to value a retiree's time (excluding maintenance periods) at the foregone market wage rate; i.e., at the wage rate he could have earned by working. Except for the semiretired, this measure is a less satisfactory approximation to the value of retiree time than it was for worker time. Since the retiree does not work at all, there is no reason, in principle, for the value of his time at the margin to equal the wage rate available to him. Prior reasoning in this instance only tells us that the marginal time value is no less than the foregone wage.

In the early years of retirement the foregone wage can be reasonably approximated by the wage at retirement. Since we are interested only in the incipient market work effort of retirees, there will be no taxes on income, so the gross wage rate at retirement (roughly about \$3.50 per hour on average for these individuals being considered here) would be the appropriate measure of (marginal) time value for the early years of retirement. However, as a retiree ages and his physical and mental faculties deteriorate, the opportunity cost of his time, as measured by the foregone wage, presumably falls to zero. Over the entire period of retirement, taken here to be from

age 65 through age 87,³⁴ an average opportunity "wage" of around \$2.00 per hour does not, therefore, seem unreasonable.

MORTALITY AMONG RETIREES. Data on deaths from asbestos-type diseases among retirees suggests that the average age at which retirees die from asbestos diseases is about 70 years.³⁵ Prevention of premature retiree deaths from asbestos diseases would therefore have an average present "worth" to those retirees who would have otherwise died of about \$157,000 at a 4 per cent rate of discount, or \$109,000 at a 10 per cent rate (i.e., \$2.00 an hour times 6,574 non-maintenance hours per year from age 70--the average age at death--to age 88, with all values reduced to account for the probabilities of dying and the time value of money). The estimated number of retiree deaths is 592 (bracketed by 234 and 951). Thus, the average present "value," to those retirees who would have otherwise died, of eliminating asbestos-related mortality is about \$92.9 million annually, discounting at 4 per cent (bounded by \$35.7 million and \$149.3 million), and around \$64.5 million annually, discounting at 10 per cent (\$25.5 million and \$103.7 million are extremes).

MORBIDITY AMONG RETIREES. To these mortality-related figures we need to add estimates of the "value" of reduced morbidity to retirees in order to estimate the willingness-to-pay of retirees for the elimination of asbestos diseases. Earlier we estimated the average disability period from asbestos diseases to be about one year. Thus, as our estimator of the average morbidity losses to retirees, we used \$13,000 (i.e., approximately \$2.00 per hour times 6,574 non-maintenance hours in a year). This estimator presumably overstates the actual morbidity

losses since illnesses will not generally prevent one from engaging in all productive or leisure-time activities. The estimated annual number of new cases among retirees is 693 (273 and 1,113 are extremes). Consequently, the average "worth" to retirees of preventing asbestos-related morbidity is estimated to be \$9.1 million annually (\$3.6 million and \$14.6 million are extreme estimates).

The "Value" of the Retirement Years to Workers

We have attempted to measure, however crudely, the willingness-to-pay of retirees for a retirement free of asbestos diseases and the willingness-to-pay of workers for freedom from asbestos diseases during their working years. The measures for workers, however, did not include the present value of the non-market output (including leisure) they could expect to produce during their retirement years. In this section we estimate this benefit of the asbestos standard.

In the preceeding section we assumed that a retiree's time was, on average, worth \$2.00 an hour or about \$13,000 a year (assuming 6,574 non-maintenance hours in a year) for each year of the retirement period (taken here to be from age 65 through age 87). By reducing this amount to account for the probability of dying and the time value of money, we can compute the present value of the retirement years to workers in the different age groups.

Given the number and the age distribution of deaths among workers, the additional annual benefits implied by these measures are \$116.8 million (\pm \$70.7 million) using a 4 per cent rate of discount, and \$51.4 million (\pm \$31.1 million) with a 10 per cent discount rate.

Compliance Costs

Estimates of the compliance costs occasioned by the asbestos standard derive from data collected by Arthur D. Little, Inc., for a study of the economic impact of the then proposed asbestos standard. Unfortunately, there seems good reason for suspecting a substantial upward bias in Little's cost estimates. The data were collected using the DELPHI survey technique, and most of the participants were executives in the very firms that would be making the compliance expenditures; thus, they seem likely to have strong, profit-motivated incentives to inflate their predictions of compliance costs. Consequently, we adjusted these estimates by assuming--an admittedly arbitrary, but not unreasonable assumption--that the hypothesized upward bias in the estimates left unchanged the relationship between compliance costs and the proportion of the initial dust concentration rated. Under this assumption, we computed annual compliance costs to be about \$70.5 million with a 4 per cent discount rate, and about \$73.5 million under a 10 per cent rate of discount.

Enforcement Costs

The estimator of enforcement costs we employed is the proportion of total current inspection and adjudication expenditures occasioned by the asbestos standard. This estimator is likely to provide only very rough indications of the enforcement costs that strict enforcement of a 2-fiber standard would require because (a) current data reflect activities under a 5-fiber standard, and (b) these efforts may not even be sufficient to attain the 5-fiber goal. Following this approach, we estimated that public sector expenditures on enforcing the asbestos standard would be around \$200,000 per year.

Consumer Surplus Losses

To quantify the consumer surplus losses, we needed estimates of the price elasticities of market supply and demand for the industries affected by the standard. We employed a structural model of industry supply and demand developed by Richardson (1973a) in estimating the desired elasticities for the asbestos products industry; this model assumes constant costs in domestic production. Estimation of this model produced a price elasticity of demand for asbestos products of -0.7. Assuming that compliance expenditures will have little, if any, effect on all other costs of production, this elasticity--combined with 1971 sales of \$992 million in the products industry--implies that the consumer surplus ("triangle") loss associated with the compliance outlays is about \$500,000 annually.

○ It was not found feasible to directly estimate the price elasticity of demand for asbestos insulation services. In order to obtain a rough measure of the consumer surplus loss in the insulation market, we assumed the price elasticity to be -0.5, or somewhat less than the elasticity for asbestos products so as to account for the absence of foreign-produced substitutes. Given initial (1971) industry sales of about \$570 million, the resulting consumer surplus loss was calculated to be approximately \$660,000 a year.

Unemployment Costs

Our estimator of unemployment costs was the product of (1) the average period of unemployment occasioned by the standard, (2) the number of workers unemployed, and (3) average income lost due to the resulting unemployment. The key assumptions made in computing

this cost were (a) that production functions are fixed coefficient, and (b) that the average period of unemployment among those laid off in response to the standard is the same as the average period of unemployment for all unemployed workers during the 1965-1973 period, namely, about 10 weeks.³⁶ We estimated the standard-induced unemployment to be in the neighborhood of 1,360 asbestos insulation workers (3.4 per cent of all such workers) and 1,300 asbestos products workers (2.6 per cent of all such workers). Combining these estimates with the average incomes of the affected workers, we computed total (one-time) unemployment costs to be around \$4.4 million.

Benefits and Costs of the Asbestos Standard: Summary Measures

This section organizes and summarizes the various measures of benefits and costs that we have discussed in the above sections. Since some of the benefits we attempted to quantify are usually not measured in benefit-cost studies--due to the lack of a widely shared methodology for measuring them--we present two sets of summary benefit-costs figures. One set includes only what might be referred to as the "conventional" measures of benefits from improved health, namely, money income gains from reductions in premature mortality and morbidity, and savings in treatment resources. The second set of summary measures encompasses all of the estimates made above.

ANNUAL BENEFITS AND COSTS OF THE STANDARD. Tables 2 and 3 merely organize all of the quantifications. Table 2 contains estimates of those benefits of the asbestos standard that we found feasible to measure. (Obviously, some potentially significant benefits were left unquantified, e.g., those occasioned by reduced pain and suffering;

these unmeasured benefits are reviewed below.) The columns in Table correspond to the alternative assumptions regarding the number of people presently dying from asbestos disease; columns (3) and (6) contain the benefit estimates based on the number of (construction worker) deaths that seem the most plausible. It is important to note that Table 2 presents estimates of the annual benefits after the asbestos standard has had time to eliminate asbestos diseases. Because of the time lag between exposure and onset of the diseases, the number of asbestos diseases will not fall to zero until at least 30 years after the imposition of the standard (and assuming full enforcement of the standard over time). Moreover, these estimates assume, at this point, that labor's productivity remains constant over time. We will return to these points momentarily.

The estimated costs of the asbestos standard are presented in Table 3. These costs, with one exception, recur annually from the time the standard is imposed (and becomes effective). The one exception is the one-time cost of unemployment caused by the standard. These are short-term adjustment costs that are assumed to occur within a year following the imposition of the standard. Possible changes over time in these costs (and benefits), due, for instance, to technical change, are discussed below.

PRESENT VALUES OF ANNUAL BENEFITS AND COSTS. Tables 4 and 5 contain the present values of these annual benefits and costs. Present values were computed using rates of 4 and 10 per cent for time periods of 50 and 100 years. The present value computations for the social costs of the standard assumed constant costs over the time periods considered, excepting the first year. Benefits were also

Table 2.

Estimated Annual Benefits of the Asbestos Standard,
30 or More Years After Its Imposition, at 4 Per Cent
Discount Rate (millions of 1970 dollars)

Form of the Benefit	Number of Lives Saved Annually		
	630	1,596	2,563
(1)	(2)	(3)	(4)
Reduced Mortality: Money Income Gains	\$23.0	\$55.0	\$86.0
Reduced Morbidity: Money Income Gains	3.7	8.9	14.1
Treatment Resources Saved	2.2	5.8	9.4
Reduced Mortality: Non- Market Gains of Workers	43.0	104.0	164.0
Reduced Morbidity: Non- Market Gains of Workers	7.0	16.9	26.6
Reduced Mortality: Non- Market Gains of Retirees	35.7	92.9	149.3
Reduced Morbidity: Non- Market Gains of Retirees	3.6	9.1	14.6
Value of Retirement Years to Workers	46.1	116.8	187.5
Total: Conventional Measures ¹	\$28.9	\$69.7	\$109.5
Total: All Benefits ²	\$164.3	\$408.8	\$651.5

¹The sum of money income gains from reduced morbidity and mortality and savings in treatment resources.

²Includes all of the benefits in the above table.

Source of Data: Our calculations.

Table 2 (continued)

Estimated Annual Benefits of the Asbestos Standard,
30 or More Years After Its Imposition, at 10 Per Cent
Discount Rate (millions of 1970 dollars)

Form of the Benefit (1)	Number of Lives Saved Annually		
	630 (5)	1,596 (6)	2,563 (7)
Reduced Mortality: Money Income Gains	\$17.0	\$41.0	\$65.0
Reduced Morbidity: Money Income Gains	3.7	8.9	14.1
Treatment Resources Saved	2.2	5.8	9.4
Reduced Mortality: Non- Market Gains of Workers	32.0	79.0	123.0
Reduced Morbidity: Non- Market Gains of Workers	7.0	16.9	26.6
Reduced Mortality: Non- Market Gains of Retirees	25.5	64.5	103.7
Reduced Morbidity: Non- Market Gains of Retirees	3.6	9.1	14.6
Value of Retirement Years to Workers	20.3	51.4	82.6
Total: Conventional Measures ¹	\$22.9	\$55.7	\$88.5
Total: All Benefits ²	\$110.3	\$276.6	\$439.0

¹The sum of money income gains from reduced morbidity and mortality and savings in treatment resources.

²Includes all of the benefits in the above table.

Source of Data: Our calculations.

Table 3

Estimates of the Annual Social Costs of the
Asbestos Standard (in millions of 1970 dollars)

	<u>4 Per Cent</u>	<u>10 Per Cent</u>
Compliance Costs	\$70.5	\$73.5
Enforcement Costs	0.2	0.2
Consumers' Surplus Losses	1.2	1.2
Unemployment Costs (one-time costs)	4.4	4.4
Total Costs, 1st year	\$76.3	\$79.3
Total Annual Costs, after 1st year	\$71.9	\$74.9

Source of Data: Our calculations.

assumed to be constant after the 29th year. Apparently few, if any, people develop asbestos diseases within the first 10 years of exposure,³⁷ so there are likely to be few reductions in asbestos-related deaths and illnesses for at least 10 years after the imposition of the standard.³⁸ Consequently, we assumed that benefits will be zero during the first 10 years. To approximate the "true" annual increases in benefits from the 10th through the 29th year, we assumed that benefits would increase by the same absolute amount each year of the period. It should be emphasized that this particular benefit growth pattern is a manifestation of the remarkable time-lag between the imposition of the standard and the elimination of asbestos diseases. The secular benefit increases due, for example, to increases in worker productivity are considered below.

Table 4 also contains the benefit-cost ratios corresponding to the various assumptions about discount rates, etc. If all of the estimated benefits are included in the numerator and benefits and costs are discounted at 4 per cent, the benefit-cost ratios are substantially above unity for both the intermediate and upper bound assumptions about the number of deaths. Using a 10 per cent discount rate, the ratio exceeds one only for the upper bound assumption about the number of deaths, although the ratio is close to unity under the intermediate assumption.

Discounting at 10 per cent, the ratios are "insensitive" to changes in the time periods for which they are calculated. However, if one were to adopt a perspective of less than 50 years, e.g., 20 or 30 years, the ratios would fall substantially because of the time-stream pattern of the benefits and costs. (This last statement also

Table 4

Present Value of Benefits and Benefit-Cost Ratios,
4 Per Cent Discount Rate
 (Benefits in Millions of 1970 Dollars)

50 Years

Number of Lives Saved	Conventional Benefits ¹	All Benefits ²	B/C: Conventional Benefits	B/C: All Benefits
(1)	(2)	(3)	(4)	(5)
630	243.4	1391.8	0.16	0.90
1596	586.8	3441.1	0.38	2.22
2563	922.0	5484.5	0.60	3.54

100 Years

Number of Lives Saved	Conventional Benefits ¹	All Benefits ²	B/C: Conventional Benefits	B/C: All Benefits
(1)	(6)	(7)	(8)	(9)
630	330.6	1891.0	0.19	1.17
1596	797.2	4675.3	0.45	2.65
2563	1252.6	7451.7	0.71	4.22

¹Includes money income gains from reduced mortality and savings in treatment costs.

²Includes all of the benefits listed in Table 2.

Source of Data: Our calculations.

Table 4 (continued)

Present Value of Benefits and Benefit-Cost Ratios,10 Per Cent Discount Rate

(Benefits in Millions of 1970 Dollars)

50 Years

Number of Lives Saved	Conventional Benefits ¹	All Benefits ²	B/C: Conventional Benefits	B/C: All Benefits
(1)	(10)	(11)	(12)	(13)
630	50.6	284.6	0.07	0.38
1596	120.1	711.6	0.16	0.95
2563	191.7	1121.6	0.26	1.50

100 Years

Number of Lives Saved	Conventional Benefits ¹	All Benefits ²	B/C: Conventional Benefits	B/C: All Benefits
(1)	(14)	(15)	(16)	(17)
630	53.1	298.5	0.07	0.40
1596	125.9	746.3	0.17	0.99
2563	201.1	1176.5	0.27	1.56

¹The sum of money income gains from reduced morbidity and mortality and savings in treatment resources.

²Includes all of the benefits in the above table.

Source of Data: Our calculations.

Table 5

Present Value of Costs of Asbestos Standard,50 and 100 Years at 4 and 10 Per CentRates of Discount (Millions of 1970 Dollars)

<u>Period</u>	<u>Rate of Discount</u>	
	4 Per Cent	10 Per Cent
(1)	(2)	(3)
50 Years	\$1,549	\$747
100 Years	\$1,766	\$753

Source of Data: Our calculations.

holds, although with less force, for those ratios calculated with a 4 per cent rate.) When a 4 per cent discount rate is used, the ratios are somewhat more sensitive to the choice of time periods, with one ratio increasing by about 19 per cent (from 3.54 to 4.22) when the time period is increased from 50 to 100 years. Relative to unity, the assumption one makes regarding the number of deaths is clearly critical; seemingly less critical is the choice of the discount rate (at least over the range considered, 4 - 10 per cent).

Benefits and Costs: Changes Over Time

A restrictive assumption underlying the values of the benefits and costs in Table 4 is the constancy of all variables over time (excepting the once-and-for-all unemployment costs). In this section, we relax this assumption and investigate its implications for the magnitudes of the benefit-cost ratios. We consider changes in the magnitudes of a number of variables, including (a) the number of workers at risk, (b) labor's productivity (earnings), (c) treatment costs, and (d) compliance costs.³⁹

It seems clear that the number of workers potentially at risk (i.e., the number that would be exposed in the absence of a standard) will increase over time. The sources of this increase are (1) the probable increases in demand for asbestos and asbestos products (including insulation) and thus an increase in the number of asbestos products and insulation workers exposed, and (2) the likely increases in the number of construction workers, i.e., of those exposed "indirectly." Between 1950 and 1970, the number of construction workers increased at an annual rate of 2 per cent, that is, from 2,333,000 to 3,345,000.⁴⁰ We employ this growth rate as a proxy for the

long-term rate at which those (potentially) at risk will increase. This assumption will have the effect of increasing all of the estimated annual benefits of the asbestos standard (see Table 2) by 2 per cent a year.

In addition to this source of growth, a number of the benefits will increase over time because of increases in labor's productivity. From 1951 to 1970, average weekly earnings (before taxes) increased an average of 1.6 percent a year (from \$74.37 to \$102.70 in 1967 prices).⁴¹ In the following discussion, we assume this rate to represent the long-term growth rate of labor's productivity. Increases in the productivity of labor will increase all of the estimated benefits (i.e., the market and non-market output gains) with the exception of treatment cost savings (see Table 2), and will presumably decrease compliance and enforcement costs over time.

Increases in treatment cost savings are likely to occur because of increases in the relative price of medical services. Between 1941 and 1970, the price index for medical care increased by about 4 per cent annually, while all consumer prices increased only about 2½ per cent a year. It seems reasonable, therefore, to assume that treatment cost savings will increase 1½ per cent annually because of the increase in the relative price of medical care (treatment costs).

Finally, technical change may occasion reductions over time in the real costs of complying with the asbestos standard. Since it is difficult to predict whether or not such reductions will in fact occur for any given product, in the following discussion we assume alternatively that (1) there will be no change in the relative price

of compliance equipment, etc., and (2) the real cost of compliance will decline at a long-term rate of 1 per cent.

The effect of allowing for changes over time on the benefit-cost ratios is indicated in Table 6. At a 4 per cent discount rate, allowance for long-term growth in benefits (compliance costs assumed constant for the moment) has a substantial impact on all the benefit-cost ratios: the ratios more than double for the 50-year period, and they more than triple for the 100-year period. When the "conventional" benefit measures are used, 4 of the 6 benefit-cost ratios (at 4 per cent) exceed unity, while all of them are substantially greater than one when all of our benefit measures are included in the numerator. Allowing for a long-term decline in compliance costs (in addition to the growth in benefits) leaves only one of the twelve ratios (at 4 per cent) below unity, with some being substantially above it (e.g., as high as 27.3).

The impact of changes over time on the benefit-cost ratios is considerably less when time-streams are discounted at 10 per cent. As compared with the constant benefit-cost case, allowance for long-term growth in benefits, with compliance costs constant over time, increases the ratios by 5 to 30 per cent for the 50-year period and by 35 to 70 per cent for the 100-year period. These increases make only two previously "unfavorable" benefit-cost ratios "favorable," one for each time period. (These two ratios initially were "close" to one, i.e., 0.95 and 0.99 respectively.) Relaxation of the assumption regarding constant compliance costs has no additional effect on the balance between "favorable" and "unfavorable" benefit-cost ratios. Thus, allowance for secular changes in benefits and costs produces

Table 6

Benefit-Cost Ratios Calculated Under Alternative Assumptions
Regarding Changes in Benefits and Costs Over Time

4 Per Cent Discount Rate, 50 Year Time Period

<u>B/C Ratios: Conventional Measures¹</u>			
Number of Lives Saved	Constant Benefits and Costs	Increasing Benefits, Constant Costs	Increasing Benefits and Decreasing Compliance Costs
(1)	(2)	(3)	(4)
630	0.16	0.38	0.52
1596	0.38	0.91	1.20
1563	0.60	1.43	1.90
<u>B/C Ratios: Unconventional Measures²</u>			
(1)	(2)	(3)	(4)
630	0.90	2.21	3.00
1596	2.22	5.47	7.50
2563	3.54	8.70	11.90

¹ Numerator is sum of money gains from reduced morbidity and mortality and treatment resource savings.

² Includes all quantified benefits in numerator of ratio.

Source: Our calculations.

Table 6 (continued)

Benefit-Cost Ratios Calculated Under Alternative AssumptionsRegarding Changes in Benefits and Costs Over Time4 Per Cent Discount Rate, 100 Year Time PeriodB/C Ratios: Conventional Measures¹

Number of Lives Saved	Constant Benefits and Costs	Increasing Benefits, Constant Costs	Increasing Benefits and Decreasing Compliance Costs
(1)	(5)	(6)	(7)
630	0.19	0.81	1.20
1596	0.45	1.96	2.90
2563	0.71	3.09	4.50

B/C Ratios: Unconventional Measures²

(1)	(5)	(6)	(7)
630	1.17	4.77	6.90
1596	2.65	11.79	17.20
2563	4.22	18.77	27.30

¹ Numerator is sum of money gains from reduced morbidity and mortality and treatment resource savings.

² Includes all quantified benefits in numerator of ratio.

Source: Our calculations.

Table 6 (continued)

Benefit-Cost Ratios Calculated Under Alternative AssumptionsRegarding Changes in Benefits and Costs Over Time10 Per Cent Discount Rate, 50 Year Time Period

<u>B/C Ratios: Conventional Measures¹</u>			
Number of Lives Saved	Constant Benefits and Costs	Increasing Benefits, Constant Costs	Increasing Benefits and Decreasing Compliance Costs
(1)	(8)	(9)	(10)
630	0.07	0.09	0.11
1596	0.16	0.21	0.26
2563	0.26	0.34	0.42
<u>B/C Ratios: Unconventional Measures²</u>			
(1)	(8)	(9)	(10)
630	0.38	0.40	0.49
1596	0.95	1.07	1.33
2563	1.50	1.70	2.11

¹ Numerator is sum of money gains from reduced morbidity and mortality and treatment resource savings.

² Includes all quantified benefits in numerator of ratio.

Source: Our calculations.

Table 6 (continued)

Benefit-Cost Ratios Calculated Under Alternative AssumptionsRegarding Changes in Benefits and Costs Over Time10 Per Cent Discount Rate, 100 Year Time Period

Number of Lives Saved	<u>B/C Ratios: Conventional Measures¹</u>		
	Constant Benefits and Costs	Increasing Benefits, Constant Costs	Increasing Benefits and Decreasing Compliance Costs
(1)	(11)	(12)	(13)
630	0.07	0.12	0.15
1596	0.17	0.29	0.36
2563	0.27	0.47	0.58

	<u>B/C Ratios: Unconventional Measures²</u>		
	(11)	(12)	(13)
(1)			
630	0.40	0.55	0.68
1596	0.99	1.49	1.80
2563	1.56	2.36	2.90

¹Numerator is sum of money gains from reduced morbidity and mortality and treatment resource savings.

²Includes all quantified benefits in numerator of ratio.

Source: Our calculations.

four "favorable" and eight "unfavorable" benefit-cost ratios when time-streams are discounted at 10 per cent..

Focusing on the intermediate case (i.e., 1596 lives saved initially), measured benefits of the asbestos standard generally outweigh the measured costs when non-constant benefits (and costs) are discounted at 4 per cent. This observation is correct even if we restrict our attention to the conventional benefit-cost ratios. However, with a 10 per cent discount rate, none of the conventionally measured ratios exceed unity for the intermediate case. It is necessary to include the non-market benefit measures in order to obtain "favorable" ratios in this instance. Thus, the choice of the discount rate and the benefit measures used in computing the benefit-cost ratios is crucial in the intermediate case; that is depending upon the choice made, the resultant benefit-cost ratio may be either "favorable" or "unfavorable."

Unquantified Benefits

It is worth re-emphasizing that even though we quantified several benefits not usually measured in benefit-cost studies--including non-market productivity gains to workers and retirees from reduced morbidity and mortality--there are other potential benefits from the asbestos standard that were not quantified in this study. (All of the social costs of the standard that we identified were, to some extent, quantified in the present study.) There is reason to assume that some of these benefits (e.g., savings in the administrative costs of insurance and workmen's compensation) are negligible, at least relative to the other benefits (and costs) measured here.

One potentially important benefit that was not quantified, however, is the reduction of "psychological losses" presumably occasioned by an effective standard. There may be, for example, a substantial willingness-to-pay, among the families and friends of those who would have otherwise died, for an effective asbestos standard. A second potentially important unquantified benefit is the reduction in external costs, if any, imposed on, e.g., people living near asbestos products plants or construction sites where asbestos insulation is sprayed.

One approach to bringing these "omitted" benefits into the evaluation--aside from merely mentioning them--is to ask the following question: Could these unmeasured benefits plausibly be large enough to have made an "unfavorable" benefit-cost ratio "favorable" (greater than unity)? Alternatively, we might state the question is, "Could the unmeasured benefits per life saved plausibly be large enough to exceed the net cost per life saved?" ("Net cost per life saved" is defined as the measured (average) social cost of saving a life minus the measured (average) social benefits of saving a life.)

To construct a measure of the net cost per life saved, we made the simplifying assumption that the asbestos standard will save no lives until 20 years after its imposition (rather than 10 years), after which time it will prevent all illnesses and deaths from asbestos diseases.

All benefits and costs of the asbestos standard were also assumed to be zero until the 20th year and positive constants thereafter. The levels of the costs and benefits were chosen so as to equate their present values with those calculated using the "actual"

(i.e., predicted) time streams. Table 7 shows the estimates of the net costs per life saved under alternative assumptions regarding the number of lives saved initially, discount rates, and the patterns of benefits and costs over time. Net costs were computed for only those cases involving benefit-cost ratios less than unity. The estimates of net cost per life saved via the asbestos standard range from \$3,000 to \$748,000 depending upon the particular assumptions.

This brings us to the following difficult questions, "How large are these unmeasured benefits per life saved likely to be?" Unfortunately, we cannot hope to provide a very satisfactory answer to this question in the present study. We will attempt only to put these figures in perspective by comparing them with life-saving expenditures in selected public health programs.

Grosse estimated the cost per death averted by head and neck cancer treatment to be about \$44,000 (in prices around 1970), and by colon-rectum cancer treatment programs to be approximately \$46,000. (These two programs involved the highest costs per life saved of the several programs examined by Grosse.) These costs were computed by dividing program costs by the number of lives saved per period, so they clearly overstate the average "net cost per life saved." However, they may be reasonable approximations to the net cost for some of the lives saved, e.g., the very elderly, by these public health programs. Interpreted as a net cost, these figures compare favorably with several of the estimates of the net cost per life saved with the asbestos standard, although they fall far short of several other estimates.

Table 7

Estimates of Net Cost Per Life Saved Via the Asbestos Standard

Number of Lives Saved	Time Pattern of Benefits and Costs, 10 Per Cent Discount			Unconventional Measures ²		
	Conventional Measures ¹					
	Constant Benefits and Costs	Increasing Benefits, Constant Costs	Increasing Benefits, Decreasing Compliance Costs	Constant Benefits and Costs	Increasing Benefits, Constant Costs	Increasing Benefits, Decreasing Compliance Costs
(1)	(2)	(3)	(4)	(5)	(6)	(7)
630	\$748,000	\$236,000	\$150,000	\$486,000	\$115,000	\$68,000
1596	264,000	75,000	54,000	3,000	---	---
2563	145,000	33,000	22,000	---	---	---

Time Pattern of Benefits and Costs, 4 Per Cent Discount						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
630	\$200,000	\$16,000	---	---	---	---
1596	56,000	---	---	---	---	---
2563	18,000	---	---	---	---	---

¹ Benefits: benefits only money income gain from reduced mortality and mortality.
² All quantified benefits included in measure.

Summary

An application of the benefit-cost methodology outlined above to an evaluation of the asbestos standard produced mixed results. That is, under certain reasonable assumptions regarding, for instance, the annual number of asbestos-related deaths, the quantified benefits of the standard exceed the quantified costs; however, under other, equally plausible assumptions, the measured costs exceed the measured benefits. On balance, though, the benefit-cost analysis seems to favor the intervention, especially if "low" discount rates are considered appropriate for evaluating public programs. Even under those assumptions that generate costs in excess of benefits, the net cost per life saved does not seem "excessive" in a number of instances, and may easily be less than the unmeasured benefits per life saved. While we are inclined to conclude that the asbestos standard probably represents a move toward efficiency, we nevertheless realize that this inference is sensitive to the (reasonable) assumptions one makes.

Footnotes

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¹While the primary purpose of these laws is to compensate victims of work-related injuries, they do seek, as a sub-objective, to provide employers with at least some economic incentives to reduce job-related injuries and illnesses. See, for example, NCSWCL.

²That the protection was little more than nominal under these laws was apparently a point strongly argued by labor leaders during Congressional hearings on the need for additional OSH legislation; see Business Week, September 19, 1970, pp. 112-113. Also, see Page and O'Brien.

³This act was cited as a "...piece of landmark legislation in the area of worker protection" by Sec. of Labor James D. Hodgson (quoted in Safety Standards, U.S. Dept. of Labor, March/April, 1971, Vol. 20, No. 2, p. 2) and as "...the most far-reaching piece of legislation in OSH ever enacted" by Asst. Sec. of Labor G.C. Guenther (Safety Standards, May/June, Vol. 20, No. 3).

⁴Under the broad interpretation given to the meaning of "inter-state commerce," few firms, it would appear, are not covered--at least nominally--by this act. "The term 'commerce' means trade, traffic, commerce, transportation, or communication among the several States, or between a State and any place outside thereof, or within the District of Columbia, or a possession of the United States, ..., or between points in the same State but through a point outside thereof." Public Law 91-596, Section 3(3).

⁵Public Law 91-596, Sec. 2(b).

⁶Consider, for example, the following statement by Secretary of Labor W. Willard Wirtz (Occupational Safety and Health, Hearings before the subcommittee on Labor of the House Committee on Education and Labor, U.S.G.P.O., Washington: 1968; p. 9):

The facts clearly command action.

Each year in the most modern industrial society ever created by man:

14,500 workers are killed on the job.

Over 2.2 million workers suffer disabling injuries.

\$1.5 billion in wages are lost.

250 million man days of productivity are wasted... nearly 10

times the days lost due to strikes and other work stoppages.

The economy suffers a \$6.8 billion setback.

⁷Since the case study is an evaluation of an intervention with a particular instrument, a finding that the costs of the intervention exceeded the benefits would not imply that governmental action in this instance is necessarily inefficient. For example, some other

type of standard could be efficient even if the present one is not. Moreover, some other instrument, e.g., a government information program, may be efficient even if all types of asbestos standards represent moves away from efficiency.

⁸These terms are taken to include; as part of their meaning, death as an ultimate consequence of the disability.

⁹Weisbrod (1961), p. 34.).

¹⁰To be precise, one might also want to include the economic value of deferring, e.g., burial expenses from the present (the time of premature death) to some point in the future (presumably, the date at which one would otherwise die). For an elaboration on this point, see Ridker, R.G., The Economic Costs of Air Pollution. New York: Praeger, 1967.

¹¹These administrative costs include those costs occasioned by selling insurance, processing claims, litigation, etc.

¹²See, for example, Bureau of Labor Standards, "Dust Diseases and Workmen's Compensation," in H. E. Whipple.

¹³For a discussion of "avoidance costs" in connection with public health problems, see Weisbrod (1961).

¹⁴Of course, some workers may be risk-lovers, in which case they would enjoy a gain. Conceptually, the losses to the risk-lovers from hazard (risk) abatement could be subtracted from the gains of the risk-lovers to produce a net change.

¹⁵There may be other components to this willingness-to-pay. For example, if workers fail to demand, and receive, efficient risk-premiums, then firms may be led to inefficient substitutions of (sub-optimally priced) labor for capital. Whether or not governmental intervention would correct this inefficiency is difficult to determine. If workers are risk-ignorant (i.e., are not paid efficient risk premiums), an OSH standard may have little effect on the wage, and thus provide no incentives for correcting this substitution inefficiency. It is conceptually possible to design a tax that would stimulate firms to allocate resources efficiently. However, in practice such taxes would be very difficult to design because of their information requirements. Because of these information requirements, workmen's compensation programs can "experience rate" only relatively large firms; small firms pay premiums based on the experience of firms in their class. Thus, workmen's compensation laws may not even stimulate most firms to improve OSH, much less encourage them to use efficient combinations of labor and capital. For these reasons we are reluctant to classify this potential cost of risk ignorance (i.e., inefficient substitution of capital for labor), as a potential benefit of collective efforts to improve OSH.

¹⁶Of course, taxes and subsidies may create inefficiencies (i.e., place a "wedge" between private and social costs), but a thorough consideration of this problem is beyond the scope of this paper.

¹⁷OSHA Budget, Appendix to the Budget for Fiscal Year 1973, U.S. Government Printing Office, Washington, D.C., 1972, p. 653.

¹⁸See U.S. Department of Labor and U.S. Department of Health, Education, and Welfare, p. 108.

¹⁹OSHA Budget, Appendix to the Budget for Fiscal Year 1973, p. 653.

²⁰OSHR Budget, Appendix to the Budget for Fiscal Year 1973, p. 923.

²¹Some cases are appealed to higher courts, so the costs of adjudicating these cases would not appear entirely in OSHRC's budget.

²²This statement is based on an examination of the cases cited in the Occupational Safety and Health Reporter, Bureau of National Affairs, Washington, D.C.

²³As an example of this approach at a conceptual level, see E. J. Mishan, Cost-Benefit Analysis, Praeger, 1971.

²⁴For a study of the periods of unemployment following job loss, see M. D. Dale, Adjustment to Freer Trade, Ph.D. dissertation, University of Wisconsin - Madison, 1973. He found that the average unemployment period for workers laid-off from jobs in import-competing industries following tariff reductions may be as long as 8 or 9 months.

²⁵This measure implicitly assumes that the additional free time from being unemployed is worth nothing to the unemployed person. Thus, it serves only as an upper-bound measure on the social costs of unemployment.

²⁶To be precise, the fibers may not be more than 5 micrometers in length. The concentration is measured as a time-weighted average for an 8-hour working day. See NIOSH, Little, and Enterline, et al. There are some dissenters from this opinion. In particular, Selikoff argues that the 2-fiber standard, while perhaps effective against asbestosis, will not prevent development of asbestos-related cancers in all cases; see Brodeur.

²⁷Personal communication from Dr. Irving Selikoff, December, 1973.

²⁸Asbestos products include asbestos textiles, friction products (e.g., brake linings), paints and roofing materials, cement, flooring, gaskets, ironing board covers, and tapes.

²⁹ See NIOSH. There are other aspects of the standard; for example, a requirement that "dusty" areas be posted. These other features, however, will not concern us here.

³⁰ It was not found feasible to quantify the "psychological gains." In addition, three other potential benefits were not quantified, even though it might have been feasible to do so, as there was some evidence (see Settle) that their magnitudes were negligible relative to other benefits (and costs); these unmeasured benefits are (a) reductions in insurance administration costs, (b) reductions in avoidance costs, and (c) reductions in economic (i.e., profit) losses to the firm and in losses to the owners of capital.

³¹ Source of data: Occupational Characteristics. Bureau of the Census, 1973.

³² Source of data: Vital Statistics of the United States. Vol. II, Public Health Service, 1969.

³³ This rate is based on data in Reynolds, M. and E. Smolensky, "The Post Fisc Distribution: 1961 and 1970 Compared," National Tax Journal, September 1974.

³⁴ Our data on mortality rates extended only through age 87. In any event, this is not an unreasonable age at which to terminate the calculations: At age 80 the average life expectancy is about 8 years (Source: National Center for Health Statistics).

³⁵ Unpublished American Cancer Society data.

³⁶ Source: "The Employment Situation: March 1974," BLS, April 1974.

³⁷ Source: Selikoff, (1972) Table 4.

³⁸ If the probability of developing asbestos diseases always increased with increases in the period of exposure, then the asbestos standard would have some effect immediately. However, the relationship between exposure and probability of disease is apparently not monotonic. After about 35 to 40 years of exposure, the probability of developing an asbestos disease reaches a maximum for the "average" individual (based on unpublished American Cancer Society data).

³⁹ It did not seem worthwhile to consider changes in the magnitudes of other costs of the asbestos standard (i.e., enforcement costs and consumers' surplus losses) since they constitute only about 2 per cent of the estimated total costs of the asbestos standard.

⁴⁰ Source: Handbook of Labor Statistics, 1972. BLS, Washington, 1972.

⁴¹ Source: Economic Report of the President, 1972. Council of Economic Advisers, Washington, 1972.

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Mr. FRANK. Next we will hear from Dr. Edward Brandt, who is Assistant Secretary for Health of the U.S. Department of Health and Human Services. Proceed, Doctor.

STATEMENT OF EDWARD N. BRANDT, JR., M.D., ASSISTANT SECRETARY FOR HEALTH, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, ACCOMPANIED BY DR. DAVID P. RALL, DIRECTOR, NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES, NATIONAL INSTITUTES OF HEALTH, AND RICHARD LEMEN, DIRECTOR, DIVISION OF STANDARDS DEVELOPMENT AND TECHNOLOGY TRANSFER, CENTERS FOR DISEASE CONTROL, NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

Dr. BRANDT. Thank you very much. Mr. Chairman, with your permission, I would like to summarize my testimony but ask that the entire statement be entered into the record.

Mr. FRANK. Without objection, so ordered.

Dr. BRANDT. Thank you very much.

I am pleased to be here to describe the activities of the Department of Health and Human Services related to the public health problem of asbestos and the interaction of the Department with other organizations, both Federal and private, on this issue.

I have with me today, on my right, Dr. David P. Rall, Director of the National Institute of Environmental Health Sciences of the NIH. And on my left, Mr. Richard Lemen, Director of the Division of Standards Development and Technology Transfer of the National Institute for Occupational Safety and Health.

As I mentioned in my June 15 letter to you, Mr. Chairman, HHS has long provided significant support for research on asbestos, much of which has had regulatory implications, and issued several public health advisories on the subject.

Before I elaborate on these efforts, I would like to summarize briefly the state of our knowledge about health hazards associated with exposure to asbestos. To an important degree, this understanding is a direct result of research supported by this Department.

Asbestos is a generic term referring to a group of naturally occurring fibrous minerals that are commercially prized for their thermal and insulative properties. It is because of some of their characteristics, however, that asbestos is highly persistent in the human body once inhaled or ingested.

We know that asbestos causes specific diseases such as asbestosis, an irreversible and progressively disabling lung disease and mesothelioma, an invariably fatal malignancy of the lining of the chest or abdominal cavity.

Asbestos is one of the leading causes of lung cancer in nonsmokers. Asbestos exposure for smokers increases the risk of lung cancer approximately 55 times that of those who are not exposed to asbestos and who do not smoke.

A recent draft report by a nongovernment, international panel of experts commissioned by the Consumer Product Safety Commission and discussed in a public meeting on June 20 of this year, conclud-

ed that all major fiber types studied appear to be capable of causing lung cancer and pleural mesothelioma.

They also cited animal studies which suggest that the longer and finer fibers are more carcinogenic than shorter and coarser ones. It is not yet possible, however, to reconcile different dose-response patterns on the basis of fiber size or type.

The conclusion is that asbestos has significant disease and cancer-causing capabilities.

The Department recommends prudence in preventing all exposure to airborne asbestos wherever it is found. Because cigarette smoking significantly increases the lung cancer risk of asbestos exposure and aggravates asbestosis, we also recommend that individuals already exposed to asbestos stop smoking or never start. As an aside, I should point out that stopping smoking is, in fact, good advice for anyone that does smoke.

The Department position on the health effects of asbestos was first established in 1938 as a result of a Public Health Service supported study which found that asbestos exposure was capable of causing significant, potentially fatal disease.

This has been reinforced by Public Health Service research findings and regulatory recommendations over the years since.

The current position that there is no threshold for asbestos exposure below which excess disease does not occur leads to the recommendation consistent with this conclusion that it is prudent to prevent exposure.

The Public Health Service's first involvement in this problem took the form of research and recommendation of occupational guidelines.

In 1938, based upon the limited data then available, the Public Health Service recommended tentative threshold limit value guidelines for controlling occupational exposure to asbestos until better data became available which would permit development of more definitive standards.

In 1960, the first Federal standard was set for some workers exposed to asbestos under the Longshoremen's and Harbor Worker's Compensation Act Amendments of 1958.

In addition to this, the Walsh-Healey Public Contracts Act also adopted a standard in 1960 for asbestos air exposure.

Let me review quickly the more significant efforts of the various Public Health Service agencies, starting with the National Institute for Occupational Safety and Health.

On the basis of studies by NIOSH, in December 1971, the Occupational Safety and Health Administration issued an emergency temporary standard, calling for a substantially lower standard for asbestos than was then in effect.

In 1972, based upon a NIOSH document, OSHA determined that this temporary standard would be promulgated as their legal standard at least until July 1, 1976, when a new, more stringent standard of 2 million fibers—greater than 5 microns in length—per cubic meter would be come effective. This concentration is still the current standard.

In October 1975, OSHA announced a notice for proposed rule-making to lower the exposure limit to 500,000 fibers per cubic meter.

In December 1975, OSHA requested that NIOSH reevaluate the information available. And one year later, NIOSH recommended a more protective standard of 100,000 fibers per cubic meter.

In April of this year, OSHA again requested NIOSH assistance in developing a new, proposed rule for occupational exposure to asbestos. This effort is still underway.

NIOSH scientific expertise is also utilized by another Department of Labor agency, the Mine Safety and Health Administration.

In October 1978, they developed a list of research needs for NIOSH consideration, asbestos being included as one of six mine health hazards.

In April 1983, a final report was received on a NIOSH contracted study to document the technology currently being used to control airborne exposures. NIOSH will complete the criteria document for asbestos exposure in mining by October 1984.

I will now turn to the National Institutes of Health, they conduct and support a wide range of research related to asbestos. Recent National Cancer Institute [NCI] studies of lung cancer in several areas along the Atlantic coast have revealed that work in shipyards during World War II, when asbestos exposures were often high, largely accounts for the elevated rates of lung cancer reported in these areas during recent years.

Within the National Heart, Lung, and Blood Institute, there is research underway to develop methods for early detection of lung injury from inhaled asbestos fibers.

A major objective is to design treatment regimens that will eventually uncover differences among treatments that prevent pulmonary fibrosis without damaging the delicate structure of the lung.

Principal among its many grant supported efforts in this area has been the National Institute of Environmental Health Sciences [NIEHS] Institute's center grant support of the Environmental Health Sciences Laboratory at the Mount Sinai School of Medicine.

This group, led by Dr. Irving Selikoff, has pioneered the study of asbestos-related disease.

An NIEHS and NCI supported study by Mount Sinai scientists, presented in 1978, indicated that pleuro-pulmonary disease can occur in nonoccupational settings such as those experienced in homes of asbestos workers.

I should note that in addition to household asbestos contacts, another major source of nonoccupational contamination, especially in urban areas, relates to demolition of buildings which have asbestos-containing insulation.

Congress, in June 1974, directed the NIEHS to initiate research on the health effects of orally ingested asbestos. I am glad to report that all five of the seven resulting studies that have been publicly peer reviewed, found that the forms of asbestos tested did not cause a carcinogenic response in the animal species tested.

Mount Sinai scientists reported in 1973 that asbestos-containing building material often erodes with age, releasing asbestos fibers into the air.

In 1979, the EPA issued an Advanced Notice of Rulemaking for inspection and treatment of asbestos-containing materials in school buildings.

A final rule was issued in May 1982 which requires that elementary and secondary schools be inspected to determine whether they contain friable asbestos-containing materials.

As a result of concern over asbestos exposure in schools, the Centers for Disease Control in May 1977 notified all State health departments of the potential hazard of asbestos in schools and other buildings.

In August 1978, the HHS Secretary advised the Governors of all 50 States of the potential health risk of low levels of exposure to asbestos.

The National Cancer Institute in 1979 supported a demonstration grant in two New York City schools. This project was administered by the Occupational Safety and Health Administration. The approach developed in this project is now used as a model by numerous other school districts faced with a similar problem.

Working closely with EPA and the City of New York School District, NIOSH developed a 40-minute slide/tape program dealing with the health hazards of asbestos, possible problems during removal and disposal, and personal protective equipment for asbestos removal workers.

There have been many other actions taken to alert the public to the serious health risks associated with asbestos exposure and my written testimony, Mr. Chairman, includes references to a number of those.

In 1979, CDC was asked by the Arizona State Department of Health Services to evaluate human exposure and make recommendations regarding asbestos contamination of home sites in Globe, Ariz.

Last year, CDC participated in discussions with the State and EPA regarding the site's eligibility as a Superfund site. It was officially declared a Superfund site in July 1982.

In addition to all of these efforts, the Department has encouraged the exchange of information about asbestos by sponsoring several scientific conferences.

In December 1979, the Department hosted a meeting between scientific experts and national educational associations to discuss the potential for health risks from exposure to asbestos in schools.

Many of the efforts that I have been discussing are the result of interaction between various HHS organizations and other Federal agencies. Over the years there have been frequent ad hoc, often informal, exchanges with individuals and groups, both in and out of Government, on the subject of asbestos.

The central mechanism in HHS for coordinating programs, for exchanging information and providing advice to the Department on such public health issues as asbestos is the Committee to Coordinate Environmental and Related Programs.

A subcommittee of this committee has held interagency meetings to discuss asbestos matters of mutual concern and has sponsored two asbestos workshops.

In addition to the interaction between NIOSH and OSHA that I have already mentioned, I should add that Mr. Lemen and members of his staff at NIOSH meet monthly with their counterparts in OSHA to discuss asbestos workplace standards.

He, along with representatives of NCI and NIEHS, is also on a Department of Education task force which is to provide scientific and technical assistance to State and local educational agencies to enable them to conduct asbestos detection and control programs and to identify asbestos hazards in schools.

This task force has been recently reconvened by Secretary Bell.

My testimony today has merely highlighted our activities related to asbestos. Our efforts to understand this health hazard and to inform the public about the risks from exposure will continue. I believe in this way we are providing the basis for prudent action where necessary.

This concludes my statement, Mr. Chairman. I and my colleagues will be glad to try to answer any questions you might have, sir.

[Dr. Brandt's prepared statement follows:]

PREPARED STATEMENT OF EDWARD N. BRANDT, JR., M.D., ASSISTANT SECRETARY FOR
HEALTH, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Mr. Chairman and Members of the Committee:

I am Edward N. Brandt, Jr., M.D., Assistant Secretary for Health of the Department of Health and Human Services (HHS). I am pleased to be here to describe the activities of the Department of Health and Human Services related to the public health problem of asbestos, and its interaction with other organizations, both Federal and private, on this issue. I have with me today Dr. David P. Rall, Director of the National Institute of Environmental Health Sciences of the National Institutes of Health and Mr. Richard Lemen, Director, Division of Standards Development and Technology Transfer, Centers for Disease Control/National Institute for Occupational Safety and Health (CDC/NIOSH).

As I mentioned in my June 15 letter to you, Mr. Chairman, HHS has long provided significant support for research on asbestos, much of which has had regulatory implications, and issued several public health advisories on the subject. Before I elaborate on these efforts, I would like to summarize briefly the state of our knowledge about health hazards associated with exposure to asbestos. To an important degree, this understanding is a result of research supported by this Department.

Health Effects Associated with Asbestos Exposure

Asbestos is a generic term referring to a group of naturally occurring fibrous minerals that are commercially prized for their thermal and insulative properties, in addition to their flexibility, durability and tensile strength. Because of these characteristics, asbestos is highly persistent in the human body once inhaled or ingested.

Based on studies of workers heavily and regularly exposed to asbestos in the past before general government regulation of the workplace, we know that asbestos causes specific diseases such as asbestosis, an irreversible and progressively disabling lung disease which impairs breathing, and mesothelioma, an invariably fatal cancer of the lining of the chest or abdominal cavity. Asbestos is one of the leading causes of lung cancer in non-smokers. Asbestos exposure for smokers increases the risk of lung cancer approximately 55 times that of those who are not exposed to asbestos and who do not smoke. Asbestos is also associated with an increased risk of gastrointestinal and other cancers.

A recent draft report by a non-government, international panel of experts commissioned by the Consumer Product Safety Commission (CPSC) and discussed in a public meeting June 20, 1983, concluded that all major fibers types studied (i.e., chrysotile, amosite, and crocidolite) appear to be capable of causing lung cancer and pleural mesothelioma in humans. Laboratory data are consistent with this conclusion. The report also cited animal studies which suggest that longer and finer fibers are more carcinogenic than shorter and coarser fibers. However, short fibers are far more numerous in the environment, and no dimensional threshold has been established. It is not yet possible to reconcile different dose-response patterns on the basis of fiber size or type.

The conclusion drawn by experts, in this and other countries, is that asbestos has significant disease and cancer causing capabilities. A substantial number of these experts believe that there is no level below which exposure to asbestos is without risk to health, although lower levels carry lower risks.

The Department recommends prudence in preventing all exposure to airborne asbestos wherever it is found. Because cigarette smoking significantly increases the lung cancer risk of asbestos exposure and aggravates asbestosis, we also recommend that individuals already exposed to asbestos stop smoking or never start. Cessation of smoking reduces the increased risk of lung cancer for smokers previously or currently exposed to asbestos. Stopping smoking is, in fact, good advice for anyone who does smoke.

The Department position on the health effects of asbestos was first established in 1938 as a result of a Public Health Service (PHS) supported study which found that asbestos exposure was capable of causing significant, potentially fatal disease (asbestosis). This has been reinforced by PHS research findings and regulatory recommendations over the years since. The current position was established in a 1978 physician advisory from the Surgeon General and in a letter from the HHS Secretary to the Governors of all 50 states. The current position that there is no threshold for asbestos exposure below which excess disease does not appear leads to the recommendation consistent with this conclusion that it is prudent to prevent exposures. The CPSC Chronic Hazard Advisory Panel on Asbestos reaffirmed that there is no level of exposure at which there is no risk. It also concluded in its draft report that there is a clear link between exposure to asbestos and cancer, with disease risk aggravated by increasing exposure.

Early Public Health Service Efforts

The Public Health Services' (PHS) first involvement in this problem took the form of research and recommendation of occupational guidelines. PHS began research into the health effects of asbestos exposure in the mid-1930's. These early research efforts found excessive lung disease (asbestosis) in asbestos workers and later suggested that lung cancer may occur more frequently in asbestos workers than in the general populations. In 1938, based upon the limited data then available, PHS recommended tentative threshold limit value guidelines for controlling occupational exposure to asbestos until better data became available which would permit development of more definitive standards. While these guidelines did not have the force of law, and were not binding, they did provide guidance from which industry and the states could develop and enforce protective measures and a safe working environment. In 1946, the PHS proposed limit on asbestos exposure was adopted by the American Conference of Governmental Industrial Hygienists (ACGIH), a private technical society which pioneered in formulation and recommendation of occupational health standards.

In 1960, the first Federal standard was set for some workers exposed to asbestos. This was established under the Longshoremen's and Harbor Workers' Compensation Act Amendments (44 Stat. 1444, 33, U.S.C. 941) of 1958, which provided compensation for injuries suffered by employees when they were navigable waters of the United States, including dry docks.

In addition to this Act the Walsh-Healey Public Contracts Act (49 Stat. 2036, 41 U.S.C. 35 et seq.) Also adopted a standard in 1960 for asbestos air

exposure. In 1969, under the Walsh-Healey Act a new set of standards was adopted using the ACGIH recommended level for asbestos at 2,000,000 fibers (greater than 5 microns in length) per cubic meter..

I would like to review quickly the more significant efforts of the various Public Health Services agencies since these early findings first raised concern over exposure to asbestos.

National Institute for Occupational Safety and Health (NIOSH)

With the passage of the Occupational Safety and Health Act of 1970, the Department of Labor's new Occupational Safety and Health Administration (OSHA), adopted for general industry all of the 1968 ACGIH standard threshold limit values, which included an occupational exposure limit for asbestos. This Act established the National Institute for Occupational Safety and Health (NIOSH) to develop and recommend occupational safety and health standards. In December 1971, citing: "increasing information on the results of exposure of employees to airborne asbestos dust, including recent studies by the National Institute for Occupational Safety and Health and others. . . ." OSHA issued an emergency temporary standard, calling for a substantially lower standard. This standard included engineering controls such as vacuum sweeping and local exhaust ventilation as well as a respiratory protection provision for limiting worker exposure. In 1972, based on a NIOSH criteria document, OSHA determined that this temporary standard would be promulgated as their legal standard until July 1, 1976, when a new, more stringent standard of 2,000,000 fibers (greater than 5 microns in length) per cubic meter would become effective. This concentration is still the current standard.

With mounting evidence of the adverse health effects of exposure to asbestos, OSHA, in 1975, decided that a reexamination of the standard's general premises and structure was necessary. In October 1975, OSHA announced a notice for proposed rulemaking to lower the exposure limit to 500,000 fibers (greater than 5 microns in length) per cubic meter. In December 1975, OSHA requested that NIOSH reevaluate the information available on the health effects of occupational exposure to asbestos fibers and advise OSHA on the results of this study. One year later, NIOSH recommended a more protective standard of 100,000 fibers (greater than 5 microns in length) per cubic meter should be promulgated.

No further action on the OSHA Standard or the NIOSH recommendation occurred until September 1979, when a NIOSH/OSHA Committee was formed to review the scientific information concerning asbestos-related disease and to assess the adequacy of the current OSHA occupational health standard. This committee reaffirmed the December 1976 NIOSH recommended standard.

In April of this year OSHA again requested NIOSH assistance in developing a new proposed rule for occupational exposure to asbestos. This effort is still underway.

NIOSH's scientific expertise is also utilized by another Department of Labor agency, the Mine Safety and Health Administration (MSHA). In October 1978, MSHA developed a list of research needs for NIOSH's consideration; asbestos was included as one of six mine health hazards. Because MSHA believed the current standard needed to be re-evaluated, NIOSH was requested to develop the necessary criteria. In April 1983, a final report was received on a NIOSH

contracted study to document the technology currently being used to control airborne exposures to asbestos in mines and mills. NIOSH will use this information in order to complete the criteria document for asbestos exposure in mining by October 1984.

In carrying out its responsibility to develop and recommend health and safety standards, NIOSH (and its predecessor organizations) has conducted studies of workers involved in manufacturing asbestos textiles, cement pipe, floor tile, friction materials, roofing materials, thermal pipe insulation, and other asbestos products. NIOSH has provided health hazard evaluations at more than 100 plants involving exposure to asbestos in many applications. Approximately 80 industrial hygiene and medical surveys have been conducted in support of NIOSH epidemiological studies on asbestos. As a result of these and other studies, NIOSH has published more than 65 scientific papers on the health effects of asbestos and methods for controlling asbestos exposure.

National Institutes of Health

NIH conducts and supports a wide range of research related to asbestos. National Cancer Institute (NCI): NCI is involved in laboratory and epidemiological studies on asbestos. The experimental work includes the study of the length of asbestos fiber as a determinant of asbestos-related diseases; study of their mechanism of action and the possible role of asbestos as a tumor promotor and/or as a co-carcinogen. Interviewing is being conducted in New York and California with groups of patients with mesothelioma to help clarify the effects of differing levels of exposure and differing types of asbestos. The Cancer Institute is also conducting studies of lung cancer in

Texas, Louisiana, and New Jersey, areas where rates for this are high. These studies will provide information on risks associated with a variety of occupations, including those involving potential asbestos exposure. NCI also has two ongoing community intervention programs.

Recent NCI studies of lung cancer in several areas along the Atlantic coast have revealed that work in shipyards during World War II, when asbestos exposures were often high, largely accounts for the elevated rates of lung cancer reported in these areas during recent years. High rates of mesothelioma have also been found in seaboard areas and also attributed to shipyard work, particularly in jobs with heavy asbestos exposures.

Asbestos is being evaluated in NCI studies of risk factors for other than mesothelioma and lung cancers, including cancers of the larynx, stomach, bladder, kidney, and ovaries. These studies will provide data to assess whether, and to what extent, asbestos may increase the risk of these cancers.

National Heart Lung and Blood Institute (NHLBI): NHLBI has research underway to develop methods for early detection of lung injury from inhaled asbestos fibers and to establish the mechanisms of asbestos-related disease processes that may eventually lead to lung fibrosis. A major objective is to design treatment regimens that will eventually uncover differences among treatments that prevent pulmonary fibrosis without damaging the delicate structure of the lung.

National Institute of Environmental Health Sciences (NIEHS): Since 1967 NIEHS has been involved in asbestos research. Principal among its many grant supported efforts in this area has been the Institute's center grant support of the Environmental Health Sciences Laboratory at the Mount Sinai School of Medicine. This group, led by Dr. Irving Selikoff, has pioneered the study of asbestos-related disease in occupational and other environmental settings, and laid out the major adverse health effects of asbestos in human populations. Many of their studies have served as the basis for asbestos regulatory recommendations.

Another of their major accomplishments has been to link mineralogy to medicine through development of methods for detecting and quantifying asbestos in air and water samples and in human tissue. For example, this group obtained air samples during the use of spackling compounds in home repair work. Their analyses of the samples revealed that asbestos is a significant component of some of these products. In 1977 the Consumer Product Safety Commission banned spackling and patching compounds containing asbestos.

An NIEHS and NCI supported study by Mount Sinai scientists, presented in 1978, indicated that pleuro-pulmonary disease can occur in non-occupational settings such as those experienced in homes of asbestos workers. Other studies by the Mount Sinai group, as well as studies done elsewhere, have found that household asbestos contact, and other types of environmental exposures, are established with an increased risk of mesothelioma, especially pleural mesothelioma. I should note that in addition to household asbestos contacts, another major source of non-occupational contamination, particularly in urban areas, relates to demolition of buildings which have asbestos-containing insulation.

Congress, in June 1974, directed NIEHS to initiate research on the health effects of orally ingested asbestos. To date, five of the seven resulting studies have been publicly peer reviewed. I am glad to report all five found that the forms of asbestos tested did not cause a carcinogenic response in the animal species tested.

Mount Sinai scientists reported in 1973 that asbestos-containing building material often erodes with age, releasing asbestos fibers into the air. In their 1977 study, they found that in the New Jersey schools studied, where there was damage to building materials, concentrations of asbestos were significantly above background ambient air levels. In 1979, EPA issued an Advanced Notice of Proposed Rulemaking for inspection and treatment of asbestos-containing materials in school buildings. A final rule was issued in May 1982 which requires that elementary and secondary schools be inspected to determine whether they contain friable asbestos-containing materials; and to keep records and notify employees and parent/teacher organizations if such materials are found.

Public Health Notification

As a result of concern over asbestos exposure in schools, the Centers for Disease Control in May 1977 notified all state health departments of the potential hazard of asbestos in schools and other buildings. In August 1978, the HHS Secretary advised the Governors of all 50 states of the potential health risk of low-levels of exposure to asbestos. He urged them to consider whether it would be prudent to eliminate from schools and other public buildings potential sources of exposure to asbestos.

The National Cancer Institute in 1979 supported a demonstration grant in two New York City schools. The project, administered by the Occupational Safety and Health Administration, took advantage of ongoing asbestos removal and containment activities to develop audiovisual materials on safe work practices. These materials have been distributed throughout the country and widely used in training of school personnel and contractors. The approach developed in this grant project is now used as a model by numerous other school districts faced with a similar problem.

NCI also funded a grant program through NIOSH to demonstrate, on a regional basis, methods of dealing with asbestos in schools and other buildings. Working closely with EPA and the City of New York School District, NIOSH developed a 40 minute slide/tape program dealing with the health hazards of asbestos, possible problems during removal and disposal, and personal protective equipment for asbestos removal workers. Copies were distributed through the NIOSH, OSHA and EPA regional offices to many of the Nation's school districts and others interested in the protection of workers involved in asbestos removal operations.

There have been many other actions taken to alert the public to the serious health risks associated with asbestos exposure. In April 1978, following completion of a study supported by NIEHS indicating the significant risk of asbestos-associated disease in U.S. shipyards, the former Secretary announced steps the Department was taking to inform doctors, workers and others about the increased health risks of asbestos exposure. The Surgeon General then sent an advisory letter to all physicians in the nation describing the health risks posed by asbestos and providing sources of additional information on asbestos-related diseases.

NCI initiated a public information campaign to further increase awareness of the nature, extent, and seriousness of asbestos exposure for populations at risk. The campaign included recommendations to stop smoking, consult a physician where there has been possible exposure, and seek prompt medical treatment for any respiratory ailment.

As part of this effort, forty million flyers were distributed to Social Security and Civil Service retirees. Ten thousand information kits were sent to groups such as labor, industry and fraternal organizations. Special material was included for retired military employees. Media kits containing a press release, several magazine and newspaper public service announcements, and pamphlets written for lay audiences were mailed to city editors of approximately 1500 daily newspapers across the country. As with radio and television materials, a special effort was made to reach the high priority markets.

Further strategy to reach high risk groups directly was the placement of an asbestos pamphlet, "Asbestos Exposure--What It Means, What to Do," in supermarket racks and Social Security regional offices. Over 1.2 million copies of these pamphlets were placed in racks in about 4000 supermarkets and discount stores.

Another significant NCI supported information dissemination effort was the completion and distribution in 1981 of a National Correspondence Course on Lung Cancer and Asbestos-Related Pulmonary Disease, by the American College of Chest Physicians. To date, approximately 40,000 copies have been distributed to physicians specializing in pulmonary diseases, occupational and internal

medicine, and for use in medical schools, cancer centers and special training programs. This course, which is based on review of the world literature, is believed to be unique in its field.

In 1979, CDC was asked by the Arizona State Department of Health Services to evaluate human exposure and make recommendations regarding asbestos contamination of home sites in Globe, Arizona. In early 1980, after CDC/NIOSH evaluated initial data on asbestos exposure, CDC Director, Dr. William Foege, recommended to the State that all residents be evacuated from the site as expeditiously as possible with arrangements made to minimize exposure during this process. Subsequently, the State temporarily relocated the residents, covered home sites with topsoil, decontaminated the house trailers, and demolished the old asbestos mill that was still on the subdivision site. CDC continued to participate with the State in an environmental monitoring program designed to provide a more detailed assessment of the exposure to asbestos. And last year CDC participated in discussions with the State and EPA regarding the site's eligibility as a Superfund site. It was officially declared a Superfund site in July 1982.

On April 4, 1983, CDC issued a Public Health Advisory for the Globe, Arizona site recommending that remedial action to prevent chronic, long-term exposure to asbestos was justified from a public health standpoint. The rationale for this advisory, based on long standing Department concern for asbestos health hazards, was essentially identical to that for recommendations in early 1980. This latest advisory continued to recommend action to prevent further long-term exposure to asbestos and limitation of exposure, by workers and nearby populations, during and after cleanup operations.

In addition to these type of efforts, the Department has encouraged exchange of information about asbestos by sponsoring several scientific conferences. In 1964, NIH supported a New York Academy of Sciences' international conference on the "Biological Effects of Asbestos." By bringing together a remarkably diverse range of disciplines, this conference is considered a milestone in the evolution of awareness of asbestos health hazards. Four years later, NIEHS held a Mesothelioma Registry Conference to develop a method of information collection upon which to base standards. In 1973, NIEHS and EPA sponsored an international conference on "The Biological Effects of Orally Ingested Asbestos." Then in 1978, NCI, NIOSH and NIEHS sponsored another New York Academy of Sciences' international conference on "Health Hazards of Asbestos Exposure," designed as a follow up to the 1964 conference. In April 1982, FDA's National Center for Toxicological Research (NCTR) jointly sponsored a "Second International Workshop on the Effects of Mineral Dusts" with the National Toxicology Program (NTP), a program to coordinate toxicology research and testing in HHS.

In December 1979, the Department hosted a meeting between scientific experts and national educational associations to discuss the potential for health risks from exposure to asbestos in schools. This meeting reflected the Department's desire that the biomedical basis for concern about asbestos be available to those who must make decisions regarding this problem.

Interagency Cooperation

Many of the efforts I have just mentioned are the result of interaction between various HHS organizations and other Federal agencies. Over the years there have been frequent ad hoc, often informal, exchanges with individuals and groups, both in and out of government, on the subject of asbestos. Many of these have been at the working scientist level.

The central mechanism in HHS for coordinating programs, exchanging information and providing advice to the Department on such public health issues as asbestos is the Committee to Coordinate Environmental and Related Programs (CCERP). For example, a subcommittee of CCERP has held interagency meetings to discuss asbestos matters of mutual concern and has sponsored two asbestos workshops. In February 1980, NIEHS published the proceedings of one of these, a "Workshop on the Biological Effects of Mineral Fibers and Particulates;" asbestos was the central topic.

An earlier CCERP interagency subcommittee developed the protocol, which was publicly reviewed, for the asbestos oral ingestion studies I previously mentioned. The National Toxicology Program, which is now responsible for these studies, combines the toxicological resources of NIH, FDA/NCTR and CDC/NIOSH. Members of its Executive Committee include the major environmental health regulatory agencies (FDA, CPSC, EPA and OSHA). NTP is also responsible for compilation of the congressionally mandated Annual Report On Carcinogens, an interagency effort which provides, among information on other chemicals, yearly updates on production, use, and regulation of asbestos.

In recent weeks EPA has initiated an investigation of asbestos sites in the country. EPA headquarters staff has directed their regional offices to obtain asbestos consultation and health advisories from HHS on each site investigated. In response to this increased effort by EPA, our staff members have visited seven sites in New Hampshire and have issued recommendations and health advisories to EPA on these sites. Initial consultation has also been provided to EPA on potential sites in Delaware and South Carolina. Other sites have been identified in New Jersey, Pennsylvania, Illinois, Indiana, Texas, Louisiana and Nevada. As EPA continues its investigation, we expect our involvement in asbestos to increase.

In addition to the interaction between NIOSH and OSHA that I have already mentioned, I should add that Mr. Lemen and members of his staff at NIOSH meet monthly with their counterparts in OSHA to discuss asbestos workplace standards.

Mr. Lemen, along with representatives of NCI and NIEHS, is also on a Department of Education Task Force which is to provide scientific and technical assistance to state and local educational agencies to enable them to conduct asbestos detection and control programs and to identify asbestos hazards in schools. This Task Force, has been recently reconvened by Education Secretary Bell. CDC's Center for Environmental Health continues to be available to assist state health departments as they advise school boards on implementing EPA regulation and guidelines.

Conclusion

My testimony today has merely highlighted the Department's activities related to asbestos. Our efforts to understand this health hazard and to inform the public about the risks from exposure will continue. I believe in this way we are providing the basis for prudent action where necessary.

This concludes my statement to the Committee. I would be glad to answer any questions you might have.

Mr. FRANK. Thank you very much, Dr. Brandt.

First, I want to congratulate you for the presentation which was a useful one and also for the fact that you did, summarize it. I have found from experience that people who come with written statements and tell us that they are going to summarize them, almost inevitably take 10 percent more time to summarize the statement than they would to read them.

I would suggest that if there is any in-service training you might run a testimony-summarizing institute for people in Washington. Summarizing doesn't mean that when you read the testimony you think of some new things and you explain it. I appreciate that. It is a rare talent that you have and I have come to appreciate it more and more in my new capacity here.

Reference was made earlier that in 1938, the Public Health Service looked at asbestos, and proposed a standard which caused a lot of debate. This isn't a partisan issue, this is one where there was really a failure of the Government apparatus in general over a long period of time, both legislative and executive, to act to protect people from something that only Government could have protected them from. We have just begun to address it correctly.

Are you real familiar with the circumstances in 1938? Do you know if there was any effort to try and get that established as a standard that people would adhere to when the Public Health Service, at the governmental level, said this is a dangerous business and it is going to cause serious problems?

Dr. BRANDT. I wasn't, of course, in this job in 1938, but the Public Health Service widely distributed that guideline at that time and, of course, there was no regulatory mechanism in place at the time. I think, obviously, that the war certainly intervened shortly after that document was published and made available. So I think there was an attempt by the Public Health Service in those days to get the information out and make it available.

However, it is clear that the intervention of World War II obviously interfered with perhaps even wider dissemination.

Mr. FRANK. I guess that is true, although, we had about 3 years before the war broke out and the period after.

Is there any evidence that you are familiar with of substantial adherence to the standard once it was promulgated as a voluntary standard?

Dr. BRANDT. In 1938?

Mr. FRANK. And subsequently, including, say, in the post World War II period.

Dr. BRANDT. Let me ask Mr. Lemen to respond to that.

Mr. LEMEN. I think probably the most appropriate answer is that some of the companies probably did try and adhere to that standard to the best of their ability. However, because it really carried no force of law they were at no obligation to do so.

So many of the companies, for economic reasons, did not install control technology in their plants, did not adhere to it. So I would say, and I have no firsthand knowledge of this, however, from the reading I have done, I would say that some companies did try to adhere to it. However, a great majority did not.

Mr. FRANK. That is what I would have expected. I guess also some of those that might have tried to adhere to it might have

found themselves at a certain competitive disadvantage. In a closely competitive industry they were incurring a cost that had no immediate short-term benefit to them; it had a societal benefit.

I think that is relevant because in one of the models we are told to consider sometimes is that we need not impose a strict, binding regulation, but that we can promulgate information and people can deal with that voluntarily.

Although it is not a scientifically studied point, but your sense is that having promulgated it voluntarily did not bring about a lot of compliance, that the majority did not comply. I think that is what you would expect in a situation in which people are competitive with each other, people have a responsibility to stockholders, and voluntarily incurring a cost that they were not legally required to incur is not something that appeals to most people who are in business to make a profit.

Dr. BRANDT. I think there are two other points to make though, Mr. Chairman, and one of these is that our awareness of occupational exposures to hazardous materials was certainly not very well developed in the 1930's. And indeed, I think one could argue not well developed in this country until the 1950's, so that it is, I think, in one sense, not too surprising that that did not attract as much attention as it certainly would today.

Second is the whole issue of technology and the availability of technology for control which was obviously not as well developed in those days.

Our understanding of occupational illnesses and occupational exposures certainly has grown considerably, I guess, since around the midfifties, early sixties.

Mr. FRANK. I understand that, Dr. Brandt, but in 1938 the Public Health Service said, look, this is a dangerous thing and it is going to cause some illnesses. The general sense of occupational problems might not have been there but this may have been seen as an exception. It was promulgated in 1938 and 1946, the Public Health Service proposed a limit, and it was adopted by the American Conference on Governmental Industrial Hygienists. My guess is still that what Mr. Lemen said is correct, that that was really not going to produce a lot of compliance.

Again, when you run a competitive situation this way, I think that there has to be some uniform rules if you are going to expect people to deal with it.

You have heard some of the estimates of what we would have saved. I am assuming that if that had been promulgated in 1938 as a binding standard, would that have made economic sense?

Dr. BRANDT. Quite frankly, Mr. Chairman, I don't know whether it would have made economic sense or not, but I think clearly it would have made sense from the standpoint of the number of people who might have been protected from the development of illness.

Mr. FRANK. As you point out, we have known about this for some time, we still do not have an adequate treatment for mesothelioma. So we seem to be dealing with a substance where prevention is the only appropriate treatment.

Dr. BRANDT. Obviously, not only with this disease but with a lot of others, prevention is most effective. I think that our work at the

NIH is aimed at trying to stop the spread of the disease, or the further development of the disease once people have already been exposed, because we have some people who have clearly been exposed to asbestos who have not developed some of the more serious complications.

So I think we have two approaches. One is to try to prevent exposure and the second is to try to intervene and prevent the further development of the disease once somebody has been exposed to it.

Dr. Rall may want to add something to that.

Dr. RALL. I might point out also, that lung cancer is essentially incurable.

The chemo-prevention program at NIH and NCI based on epidemiological studies has focused and some animal studies have found that the application of certain compounds, after exposure, but before overt development of the disease, appears to delay or prevent the development of the cancer. And that is terribly exciting. Hopefully, 5 or 10 years from now we can come back and tell you about real progress in this area.

Mr. FRANK. Obviously, we all want to do what we can to deal with people who have contracted the disease in the early stages. That is a high priority.

My point, though, is we have known about the dangers of asbestos for sometime and we are now getting these kind of breakthroughs. The point I make and what I am trying to do is look at the benefits and the cost of regulation. Controlling the cost of health care is obviously a major concern of all at the Federal level. The medicare problems, and others are very serious.

It seems clear to me, from what I have heard so far and what I expected to hear, is that had we imposed a fairly strict standard against the use of asbestos 40 years ago, our medicare problems today would be somewhat less than they are. An example that prevention, among other things, not only saves us money if you look at work lost, et cetera, but prevention is a very essential part of a rational scheme to control health care costs. And where we, by our laxity, allow people to contract diseases that we could have avoided as we did forty years ago, we are incurring health care costs.

I assume, you know, we want these breakthroughs, they are going to cost us, and we don't stint on those costs but it does show in other areas proper regulation is an economically beneficial thing to do. This kind of prevention is a very important piece of an overall health care cost control program, particularly when we start projecting out into those later years—look at the year 2000, and look at those numbers—it would scare the hell out of everybody.

I thank you gentlemen. I appreciate it very much.

Dr. BRANDT. Thank you.

Mr. FRANK. Our next witness is Mr. Thorne Auchter, Assistant Secretary for Occupational Safety and Health, U.S. Department of Labor.

Go ahead, Mr. Auchter.

STATEMENT OF THORNE G. AUCHTER, ASSISTANT SECRETARY OF LABOR FOR OCCUPATIONAL SAFETY AND HEALTH, U.S. DEPARTMENT OF LABOR, ACCOMPANIED BY EDWARD BAIER, DIRECTOR OF TECHNICAL SUPPORT, AND LEONARD VANCE, DIRECTOR OF HEALTH STANDARDS

Mr. AUCHTER. Mr. Chairman and members of the subcommittee: I have with me at the table Mr. Edward Baier, our Director of Technical Support, and Dr. Leonard Vance, our Director of Health Standards.

I welcome the opportunity to discuss the regulatory philosophy of the Occupational Safety and Health Administration as well as the agency's present policy on regulation of asbestos.

Underlying OSHA's approach to standards setting is the determination that this agency will undertake regulatory action only when sound, objective data demonstrate a need for regulation.

The agency is guided in its rulemaking by certain long and established procedures and principles that must be observed under the Occupational Safety and Health Act of 1970 and the Administrative Procedure Act.

There are also more recent requirements under the Regulatory Flexibility Act and Executive Order 12291 of February 17, 1981, that affect OSHA's rulemaking. Furthermore, Federal court decisions, notably the Supreme Court ruling on OSHA's standards for benzene and the ruling on cotton dust, have had a major impact upon the agency's standards development process.

Four major principles guide OSHA in setting standards to regulate workplace safety and health.

First, before a standard can be promulgated there must be a demonstration of significant risk. This is required by the Occupational Safety and Health Act as interpreted by the Supreme Court in a case involving OSHA's standard for workplace exposure to benzene.

Second, in accordance with the Court's decision in that case, it must be shown that the standard will actually reduce the risk that has been demonstrated.

Third, along with scientific data to justify the standard, the agency must gather data to show that the regulation is economically and technologically feasible for an entire industry.

Finally, the Executive order and the Regulatory Flexibility Act in their provisions for regulatory analysis require OSHA to consider carefully and systematically the economic and social consequences of all rulemaking.

Once OSHA has determined the maximum feasible level of protection in accordance with section 6(b)(5) of the Occupational Safety and Health Act, the agency analyzes the cost effectiveness of various means of achieving that level of protection.

In order to implement its regulatory principles as efficiently as possible, OSHA has put in place a regulatory management system instituted as part of an effort to strengthen the agency's overall management. This system is designed to allow the agency to determine before it initiates a regulatory action whether alternatives to regulation might not result in an equal level of workplace protection.

It also is designed to establish basic policies governing OSHA's standard setting to assure that comments from effective groups are obtained and analyzed at all stages of the standards process; to assign responsibility and schedules for standards development workloads, and to produce the documents and decision papers for use in standards projects.

This regulatory management system, together with semiannual agendas of projected standards activity that are required by Executive Order 12291, provides OSHA with effective mechanisms for placing regulatory activities under appropriate management control.

The system helps to insure the observance of existing legal policy and administrative requirements and the attainment of efficient cost-effective control of workplace hazards.

One of the items on OSHA's present regulatory agenda is the Asbestos Standard, which is the subject of this hearing.

Asbestos is used in the manufacture of a variety of products such as cement, plastics, asphalt, brake linings, ceramics, floor tiles, insulation, textiles, paper, and paint.

Asbestos exposure is also a potential hazard in roofing installation, drywall removal, demolition, and auto and ship repair.

Because asbestos fibers are carried throughout the workplace by air currents, the activities of employees directly involved with the fibers can expose numerous other manufacturing and construction workers to those asbestos fibers.

Exposure to asbestos fibers is associated with a number of diseases, including asbestosis, lung cancer, and mesothelioma, a cancer of the chest cavity lining or abdominal cavity.

Symptoms often do not appear until 20 to 30 years after initial exposure. Once established, asbestos disease may progress even after exposure ends.

From its beginnings as an agency, OSHA has recognized the dangers of asbestosis resulting from occupational exposure to asbestos.

Under the Walsh-Healey standards adopted by OSHA in 1971, the agency set a permissible workplace exposure limit of 12 airborne asbestos fibers per cubic centimeter of air.

By late 1971, accumulating medical evidence indicated that the 12-fiber limit set by OSHA earlier that year did not provide adequate worker protection.

Accordingly, an emergency temporary standard was issued in December 1971 which lowered the permissible exposure level for an 8-hour period to 5 fibers of airborne asbestos per cubic centimeter of air.

In June of 1972, OSHA issued its present asbestos standard which further lowered the permissible 8-hour exposure limit initially to 5 fibers per cubic centimeter of air, and later to 2 fibers with a maximum ceiling of 10 fibers at any one time.

This is the asbestos standard that OSHA enforces today. It was phased in over a 4-year period; the 2-fiber limit became fully effective in July 1976.

As the first comprehensive health standard developed by the agency, it served in many ways as a model for other health regulations that followed. Not only does it set a permissible exposure

level, but it also provides for work practices as well as medical surveillance.

The standard specifies engineering controls, work practices and respirators to reduce worker exposure. It requires as well that employers provide or make available comprehensive medical examinations to determine the extent and impact of exposure. Provision must also be made under the standard for change of clothing rooms, laundering of clothing, workplace monitoring, caution signs, labels, housekeeping, waste disposal, and recordkeeping.

Since promulgation of the 1972 standard, much new information has appeared on the effects of asbestos, particularly regarding the spectrum of cancers associated with exposure and the prevalence of disease in people exposed to relatively low concentrations of asbestos dust.

In the past several years, it has become apparent that the controls required in the 1972 standard are insufficient to prevent cancer, at least in some instances.

Consequently, in October 1975, OSHA published a Notice of Proposed Rulemaking to lower the permissible exposure level to 0.5 fiber per cubic centimeter of air. This proposal was not developed into a final rule.

Two months after publication of its 1975 proposal, OSHA asked the National Institute for Occupational Safety and Health to re-evaluate the information available on the health effects of occupational exposure to asbestos fibers and to advise OSHA of its findings.

In 1976, NIOSH recommended that the PEL for asbestos be reduced to 0.1 fiber per cubic centimeter, with peak concentrations not to exceed 0.5 fiber per cubic centimeter based on 15-minute samples; I repeat, based on 15-minute samples. That may be important later on.

These exposure levels were believed to be the lowest that could be detected by analytical techniques.

In 1979, NIOSH and OSHA formed a joint committee to assess the adequacy of the 2 fibers per cubic centimeter exposure level.

In a report issued in November 1980, the OSHA-NIOSH committee concluded that the permissible exposure level in OSHA's 1972 standard was inadequate.

The committee suggested that a new standard be developed for asbestos, requiring the use of substitutes where feasible and the establishment of a PEL of .1 fiber per cubic centimeter.

After taking office, I found that although there were scattered agency efforts relating to asbestos, there was no cohesive OSHA policy on development of a new standard.

In the past year, using the Regulatory Management System that I have described, the agency has completed preparatory work on revision of the standard.

A preliminary regulatory development team was created in the spring of 1982 to develop recommendations for a revised standard.

The Department of Labor team included scientists from OSHA's Directorate of Health Standards, economists from our Office of Regulatory Analysis, and an attorney from the Office of the Associate Solicitor for Occupational Safety and Health.

In February 1983, this team of experts recommended to me that the PEL be reduced and that the asbestos standard be revised in its entirety.

June 1984 was set as the projected date for a notice of proposed rulemaking, and publication of a final rule was scheduled for September 1985.

Because of the extremely serious nature of the hazards posed by asbestos, I have accelerated this schedule. In the next few months, OSHA will publish a notice for a public hearing based upon the 1975 notice of proposed rulemaking. Reduction of the permissible exposure limit will be the primary focus of this rulemaking.

A final rule, addressing that particular issue, should be completed by the end of this year.

OSHA will then begin to revise other aspects of the standard in light of the scientific, technical, and legal changes that have occurred since 1972.

The agency intends to involve labor, industry, the scientific and medical communities as well as the general public extensively in every stage of this rulemaking process.

We appreciate the efforts of this subcommittee and welcome the assistance that information developed during the course of this hearing can provide to the rulemaking process.

Mr. Chairman, you have inquired about OSHA's relationship with other Federal agencies regarding the asbestos problem.

There has been a mutual effort on the part of concerned Federal agencies to insure that regulatory authority is extended to all possible sources of asbestos exposure and that duplication is avoided in the Government's asbestos control activities.

For example, OSHA meets informally with the Environmental Protection Agency and the Consumer Product Safety Commission to coordinate agency activities that address the hazards of exposure to asbestos.

EPA and CPSC, like OSHA, are reviewing medical and scientific data and developing estimates of risk assessment.

OSHA is also a member of a task force on asbestos established by the Asbestos School Hazard Detection and Control Act of 1980.

OSHA provides advice, informally, on a case-by-case basis to local school districts on the appropriate controls and procedures to be followed in protecting workers who remove asbestos from schools.

OSHA also has produced a film or video tape series called "Doin' It Right" to guide administrators and contractors and their employees in safe asbestos removal or encapsulation techniques.

OSHA works closely with the National Institute for Occupational Safety and Health on a broad range of occupational safety and health issues, including the asbestos standard.

The Director and Deputy Director of OSHA's Health Standards Programs meet on a monthly basis with officials from NIOSH and with EPA's Office of Toxic Substances.

These are working meetings. NIOSH is also being asked to participate in discussions concerning regulation of asbestos exposure and to review drafts of OSHA's proposed new standard.

In conclusion, Mr. Chairman, I believe that OSHA's present standards-setting process is capable of producing effective, enforceable regulations.

In the past, OSHA has been criticized for failing to articulate a coherent, viable regulatory policy.

Individuals required to comply with OSHA standards were never completely certain of the agency's direction. We believe that OSHA now has a regulatory philosophy that produces standards which are reasonably necessary and appropriate to address a significant risk of material health impairment or injury. Each standard is technically and economically feasible for the regulated industry to the extent practicable.

The most cost-effective approach which insures maximum feasible protection from risk is adopted and the public has a meaningful opportunity to participate in the development of each rule.

With those principles in place, OSHA is building the public consensus that is essential for its regulatory efforts to succeed.

[Mr. Auchter's prepared statement follows:]

STATEMENT OF THORNE G. AUCHTER
ASSISTANT SECRETARY OF LABOR
FOR OCCUPATIONAL SAFETY AND HEALTH
BEFORE THE
MANPOWER AND HOUSING SUBCOMMITTEE
OF THE
HOUSE COMMITTEE ON GOVERNMENT OPERATIONS

June 28, 1983

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to discuss the regulatory philosophy of the Occupational Safety and Health Administration (OSHA) as well as the Agency's present policy on regulation of asbestos. After outlining the general principles that guide OSHA in setting standards and the new management techniques the Agency has adopted to improve its rulemaking, I will describe, as you have requested, OSHA's relationships with other Federal agencies regarding asbestos.

OSHA Standards-Setting:

Under this Administration, OSHA has taken a number of steps to ensure that its regulations are developed, designed, and applied in a fair and objective manner. Underlying OSHA's approach to standards-setting is the determination that this agency will undertake regulatory action only when sound, objective data demonstrate a need for regulation.

OSHA is also determined that all interested parties be given an opportunity to participate in the rulemaking process. I do not need to remind you that development of

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occupational safety and health standards is a time-consuming and complex process. One factor contributing to the length of this process is the need for public participation. A minimum comment period, an informative notice of proposed rulemaking, and an oral presentation of views are all required under the Occupational Safety and Health Act of 1970 (the OSH Act). It seems reasonable to assume that if employers and employees affected by the regulations are excluded from the process of developing OSHA's rules, they are more likely to challenge and delay their implementation. OSHA believes that an opportunity for public comment and participation in its rulemaking is essential in gaining acceptance of occupational safety and health standards.

In addition to the OSH Act, the Agency is guided in its rulemaking by certain long-established procedures and principles that must be observed under the Administrative Procedure Act. There are also more recent requirements under the Regulatory Flexibility Act and Executive Order 12291 of February 17, 1981, that affect OSHA's rulemaking. Furthermore, Federal Court decisions, notably the Supreme Court rulings on OSHA's standards for benzene and cotton dust, have had a major impact upon the Agency's standards-development process.

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Four major principles guide OSHA in setting standards to regulate workplace safety and health. First, before a standard can be promulgated, there must be a demonstration of significant risk. This is required by the OSH Act as interpreted by the Supreme Court in a case involving OSHA's standard for workplace exposure to benzene (Industrial Union Department, AFL-CIO v. API). Second, in accordance with the Court's decision in that case, it must be shown that the standard will actually reduce the risk that has been demonstrated. Third, along with scientific data to justify the standard, the Agency must gather data to show that the regulation is economically and technologically feasible for an entire industry. That requirement stems from the OSH Act as interpreted by a Federal Appellate court in a case involving the Agency's asbestos standard (IUD v. Hodgson), as well as from the regulatory analysis requirements in the Regulatory Flexibility Act and E.O. 12291. Finally, the Executive Order and the Regulatory Flexibility Act, in their provisions for regulatory analysis, require OSHA to consider carefully and systematically the economic and social consequences of all rulemaking. Once OSHA, following the principles I have outlined, has determined the maximum feasible level of protection in accordance with section 6(b)(5) of the OSH Act, the Agency analyzes the cost-effectiveness of

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various means of achieving that level of protection. In this way, OSHA is able to design standards that provide adequate protection for workers without imposing unnecessary requirements and expense on society.

Regulatory Impact Analyses, which are required not only by Executive Order but also by the Regulatory Flexibility Act, provide important information about the capital and operating costs of compliance with various regulatory approaches as well as estimates of reduction in risk to workers. Without these analyses, OSHA would not have adequate information on the costs its regulations impose on society or the amount of protection received by employees and would be unable to demonstrate, for example, that a standard, or a proposed standard, would actually reduce the risk in question.

In the cotton dust decision the Supreme Court ruled that the OSH Act prohibited OSHA from setting levels of protection in its health standards by means of cost-benefit ratios. However, the Court did not rule that the Act prohibited the performance of cost-benefit analyses per se. Information on benefits and costs of regulatory alternatives are helpful to the Agency in evaluating the impacts on society of proposed regulations. Such information also lets the public have as complete a picture as possible of what regulations can accomplish as well as what they cost.

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It needs to be emphasized that neither before nor after the Court decision did OSHA use cost-benefit analysis to establish levels of worker protection. What OSHA has done and continues to do is to use cost-effectiveness analysis to determine the contents of proposed standards on the basis of risk and feasibility of compliance. Non-quantifiable costs and benefits are set forth in the regulatory analyses accompanying standards as well as in the preambles to proposed and final rules.

In order to implement its regulatory principles as efficiently as possible, OSHA has put in place a Regulatory Management System. This system, instituted as part of an effort to strengthen the agency's overall management, is designed to allow the agency to determine, before it initiates a regulatory action, whether alternatives to regulation might not result in an equal level of workplace protection. It also is designed to establish basic policies governing OSHA standards-setting, to assure that comments from affected groups are obtained and analyzed at all stages of the standards process, to assign responsibility and schedules for standards-development workloads, and to produce the documents and decision papers for use in standards projects. This Regulatory Management System, together with the semi-annual

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agendas of projected standards activity that are required by E.O. 12291, provides OSHA with effective mechanisms for placing regulatory activities under appropriate management control. The System helps to ensure the observance of existing legal, policy, and administrative requirements, and the attainment of efficient, cost-effective control of workplace hazards. Using this system, OSHA expects to complete action on 15 health and 16 safety standards by the end of 1984.

Some of the results of OSHA's new approach to standards-setting are already apparent. In March 1983, OSHA issued a revised version of a hearing conservation standard that is not only less expensive than the version developed by the previous Administration, but is also oriented toward performance, or results, rather than to required specifications. The annual costs to industry of the new version are \$197.3 million, compared to \$278.7 million for the old. At the same time, the revised version maintains effective protection for an estimated 5.1 million employees exposed nationwide to high levels of workplace noise.

OSHA's Asbestos Standard:

One of the items on OSHA's present regulatory agenda is the asbestos standard, which is the subject of this hearing.

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Asbestos is a generic term used to describe certain mineral fibers which have high tensile strength, flexibility, and excellent heat resistance. These fibers, which may be readily inhaled, are used in the manufacture of a variety of products such as cement, plastics, asphalt, brake linings, ceramics, floor tiles, insulation, textiles, paper and paint. Asbestos exposure is also a potential hazard in roofing installation, drywall removal, demolition, and auto and ship repair. Because asbestos fibers are carried throughout the workplace by air currents, the activities of employees directly involved with the fibers can expose numerous other manufacturing and construction workers to asbestos fibers.

Exposure to asbestos fibers is associated with a number of diseases, including asbestosis (a non-malignant scarring of the lungs), lung cancer, cancers of the stomach, colon and rectum, and mesothelioma, a cancer of the chest cavity lining and abdominal cavity. Symptoms often do not appear until twenty to thirty years after initial exposure. Once established, asbestos disease may progress even after exposure ends.

From its beginnings as an agency, in April 1971, OSHA has recognized the dangers of asbestosis resulting from occupational exposure to asbestos. Under the Walsh-Healey standards adopted by OSHA in 1971 as a basis for enforcement action under section 6(a) of the OSH Act, the Agency set a permissible, workplace exposure limit of 12 airborne asbestos fibers per cubic centimeter of air. By late 1971, accumulating medical evidence indicated that the 12-fiber limit set by OSHA earlier that year did not provide adequate worker protection. Accordingly, an emergency temporary standard was issued in December 1971 which lowered the permissible exposure level (PEL) for an eight-hour period to 5 fibers of airborne asbestos per cubic centimeter of air.

In June 1972 OSHA issued its present asbestos standard which further lowered the permissible eight-hour exposure limit to 2 fibers per cubic centimeter of air, with a maximum ceiling of 10 fibers at any one time. This is the asbestos standard that OSHA enforces today. It was phased in over a four-year period and became fully effective in July 1976. As the first comprehensive health standard developed by the Agency, it served in many ways as a model for other health regulations that followed. Not only does it set a permissible exposure level, but it also provides for work practices and medical surveillance. The standard

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specifies engineering controls, work practices and respirators to reduce worker exposure. It requires as well that employers provide or make available comprehensive medical examinations to determine the extent and impact of asbestos exposure -- a subject discussed before this subcommittee at a hearing on April 18 in Kittery, Maine. Provision must also be made under the standard for change-of-clothing rooms, laundering of clothing, workplace monitoring, caution signs, labels, housekeeping, waste disposal, and recordkeeping.

Since promulgation of the 1972 standard, much new information has appeared on the effects of asbestos, particularly regarding the spectrum of cancers associated with exposure and the prevalence of disease in people exposed to relatively low concentrations of asbestos dust. In the past several years, it has become apparent that the controls in the 1972 standard are insufficient to prevent cancer, at least in some instances.

Consequently, in October 1975 OSHA published a Notice of Proposed Rulemaking to lower the PEL to 0.5 fiber per cubic centimeter of air (0.5 fiber/cc). This proposal, which would also have made other changes in the 1972 standard, was not developed into a final rule. We can only surmise that previous OSHA administrations, in exercising their regulatory discretion, established other standards-setting priorities.

Two months after publication of its 1975 proposal, OSHA asked the National Institute for Occupational Safety and Health (NIOSH) to reevaluate the information available on the health effects of occupational exposure to asbestos fibers and to advise OSHA of its findings. In 1976, NIOSH responded by recommending that the PEL for asbestos be reduced to 0.1 fiber/cc, with peak concentrations not to exceed 0.5 fibers/cc based on fifteen-minute samples. These exposure levels were believed to be the lowest that could be detected by analytical techniques.

In 1979 NIOSH and OSHA formed a joint committee to assess the adequacy of the 2 fibers/cc exposure level. In a report issued in November 1980, the OSHA-NIOSH committee concluded that the permissible exposure level (PEL) in OSHA's 1972 standard was inadequate. The committee suggested that a new standard be developed for asbestos, requiring the use of substitutes where feasible and the establishment of a PEL of 0.1 fiber per cubic centimeter.

After taking office I found that although there were scattered Agency efforts relating to asbestos, there was no cohesive OSHA policy on development of a new standard. In the past year, using the Regulatory Management System that I have described, the Agency has completed preparatory work on

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revision of the standard. A preliminary regulatory development team was created in the spring of 1982 to develop recommendations for a revised standard. The Department of Labor team included scientists from OSHA's Directorate of Health Standards, economists from our Office of Regulatory Analysis, and an attorney from the Office of the Associate Solicitor for Occupational Safety and Health. In February 1983, this team of experts recommended to me that the PEL be reduced and that the asbestos standard be revised in its entirety. June 1984 was set as the projected date for a Notice of Proposed Rulemaking, and publication of a Final Rule was scheduled for September 1985.

Because of the extremely serious nature of the hazards posed by asbestos, I have accelerated this schedule. In the next few months OSHA will publish a notice for a public hearing based upon the 1975 Notice of Proposed Rulemaking. Reduction of the permissible exposure limit will be the primary focus of this rulemaking. A final rule addressing that issue should be completed later this year. OSHA will then begin to revise other aspects of the standard in light of the scientific, technical, and legal changes that have occurred since 1972.

The Agency intends to involve labor, industry, the scientific and medical communities as well as the general

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public extensively in every stage of this rulemaking process. We appreciate the efforts of this subcommittee and welcome the assistance that information developed during the course of this hearing can provide to the rulemaking process.

Interagency Cooperative Efforts on Asbestos:

Mr. Chairman, you have inquired about OSHA's relationship with other Federal agencies regarding the asbestos problem. There has been a mutual effort on the part of concerned Federal agencies to ensure that regulatory authority is extended to all possible sources of asbestos exposure and that duplication is avoided in the government's asbestos-control activities. For example, OSHA meets informally with the Environmental Protection Agency (EPA) and the Consumer Product Safety Commission (CPSC) to coordinate agency activities that address the hazards of exposure to asbestos. EPA and CPSC, like OSHA, are reviewing medical and scientific data and developing estimates of risk assessment. By using these interagency meetings as a forum for exchange of information, OSHA has been able to inform EPA and CPSC of its future regulatory plans and to provide an opportunity for other government experts to contribute to the development of an improved standard.

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OSHA is also a member of a task force on asbestos established by the Asbestos School Hazard Detection and Control Act of 1980. The task force is tentatively scheduled to meet this summer. OSHA also provides advice, informally, on a case-by-case basis to local school districts on the appropriate controls and procedures to be followed in protecting workers who remove asbestos from schools. OSHA also has produced a film or videotape series called "Doin' It Right" to guide administrators and contractors and their employees in safe asbestos removal or encapsulation techniques.

Another example of cooperation among Federal agencies in minimizing risk from exposure to asbestos is the assistance OSHA has provided to the Coast Guard in developing a circular dealing with the safe use of asbestos. OSHA has worked with the Coast Guard to define respective areas of jurisdiction regarding asbestos exposure. The Coast Guard enforces occupational safety and health regulations aboard Coast Guard-certified vessels and at facilities located on the Outer Continental Shelf.

OSHA works closely with the National Institute for Occupational Safety and Health (NIOSH) on a broad range of occupational safety and health issues, including the asbestos standard. The Director and Deputy Director of OSHA's Health Standards Programs meet on a monthly basis with officials

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from NIOSH's Office of Toxic Substances. These are working meetings at which OSHA describes its current work on the asbestos standard and the two agencies agree on ways in which NIOSH can be of assistance in this effort. NIOSH in turn presents the results of its latest scientific studies. Moreover, NIOSH is being asked to participate in discussions concerning regulation of asbestos exposure and to review drafts of OSHA's proposed new standard.

In conclusion, Mr. Chairman, I believe that OSHA's present standards-setting process is capable of producing effective, enforceable regulations. In the past, OSHA has been criticized for failing to articulate a coherent, viable regulatory policy. Individuals required to comply with OSHA standards were never completely certain of the agency's direction. We believe that OSHA now has a regulatory philosophy that produces standards which are reasonably necessary and appropriate to address a significant risk of material health impairment or injury. Each standard is technically and economically feasible for the regulated industry to the extent practicable. The most cost-effective approach which ensures maximum feasible protection from risk is adopted and the public has a meaningful opportunity to participate in the development of each rule.

With those principles in place OSHA is building the public consensus that is essential for its regulatory efforts to succeed.

Mr. FRANK. Thank you, Mr. Auchter.

Mr. AUCHTER. Yes, sir.

Mr. FRANK. Let's begin by touching on a couple of things that was talked about earlier. I take it you would agree that in 1938, the Public Health Service proposed a standard that didn't have binding authority. In 1938, the Federal Government's Public Health Service said, look, this is a very dangerous substance and we should have stopped it. Would we have been better off if people had at that time enacted a binding restriction on the use of asbestos, in your judgment?

Mr. AUCHTER. Mr. Chairman, I believe that the information on asbestos certainly would have provided a much better environment in the workplace if it had been acted on more prudently.

Mr. Baier would like to make a comment on that.

Mr. BAIER. Yes. When Dr. Brandt mentioned that, I recalled that in 1938 the Surgeon General had convened a group of the States and, as you well know, all occupational safety and health activities were controlled by the States back then; the State group was convened fundamentally to determine the differences that the States had in terms of standards. In fact, out of that meeting came the American Conference of Governmental Industrial Hygienists; that was the beginning of ACGIH.

Now, when the act, the Occupational Safety and Health Act, was signed into law, five States had half of the occupational health personnel employed by all of the States. So, when you are talking of developing a strong regulation, the enforcement aspect may not have been there. I think that is a point to consider.

Mr. FRANK. Would you elaborate on that?

Mr. BAIER. Prior to the passage of the Occupational Safety and Health Act, the States had control of the occupational safety and health matters, and five of the States had roughly half of the occupational health—

Mr. FRANK. I see. So you are saying—

Mr. BAIER [continuing]. People to enforce the standard.

Mr. FRANK. Before the passage of the Federal Act, what you are saying is that while people knew asbestos was dangerous, not very much was being done to protect people from it?

Mr. BAIER. Apparently in five States it may have been but in 45 States, no.

Mr. FRANK. Were not?

Mr. BAIER. Yes.

Mr. FRANK. So that this does seem to be a good case for Federal action?

Mr. BAIER. Oh, yes; in fact, that was one of the reasons that we had an Occupational Safety and Health Act.

Mr. FRANK. I mentioned that because we are at a point where people are beginning to discuss where and how, and why we should regulate these things. And it seems from what we have heard today, that neither voluntary adherence or a State-by-State enforcement worked very well. You might have had the problem where people didn't know it was dangerous, and sometimes we learn things later on.

But here we have known for 45 years that we had a dangerous substance on our hands, at least 45 years. And it wasn't until the

Federal Government got into the act that anything serious was done to protect people in most of the country against this.

I think that is a strong argument that has to be kept in mind on the need for uniform national activities.

Let me ask a related question. One of the points that was made, by Dr. Settle, was that while in some cases there may be an incentive for the particular employer or industry to adopt safety regulations given the nature of the harm that is caused by asbestos, that incentive is at best attenuated and the absence of a binding promulgated governmental standard, are you not likely to see much adherence?

This is not a case where there was a free market incentive to adopt it, and while there might be in some other cases, there isn't one here.

I wonder, Mr. Auchter, what your response would be to that?

Mr. AUCHTER. I think that would be a fair statement, Mr. Chairman. The difference with asbestos compared to many of the other toxic substances that we regulate is that relatively short-term exposure can produce very, very serious consequences 20 or 25 years down the road. And unless an organization was doing a really good job of planning for that sort of contingency, they would, I think, tend to ignore that.

Mr. FRANK. And the organization itself might not be the one that would have to bear the costs so that you would have the incentive to incur some extra costs in the short term on your own isn't as strong as it would be—

Mr. AUCHTER. Really because of that long-term gestation period.

Mr. FRANK. Right.

Let me switch to our current situation. It seems we have a poor record on the part of government. I don't mean just this administration or just the executive branch.

In 1938, we decided this is serious. We finally get around, after 30 years or so, or more, to doing something about it. A standard was then promulgated since 1975 or 1976, and almost everyone has felt it has been inadequate. We are now in our third administration, we have had a lot of OSHA's, a lot of Congresses—I don't mean to exempt Congress from this because we are all in this one together.

Isn't it a somewhat unfortunate commentary that we have come from 1976 to 1983 with an admittedly inadequate standard at the Federal level?

As you point out, Mr. Auchter, a relatively short-term exposure can have very serious long-term consequences. We have allowed people to be exposed—let me go back again—because we have had a Federal piece of this as well, in shipyards and elsewhere. The Federal Government has exposed people and allowed people to be exposed for 7 years now to far more asbestos than we know to be healthy for them.

How do we resolve this kind of shortcoming in our overall administrative structure?

Mr. AUCHTER. Mr. Chairman, I do not know why in the previous Administration OSHA did not pursue its 1975 rulemaking. I have tried to find an answer to that and I have not been able to.

I will say that from the exposure levels that OSHA is currently aware of, that the levels that are in the workplace today are considerably lower than they were during the forties and early fifties when much of this exposure was taking place.

Lastly, let me see if this is the right time to bring this up. The question of how you regulate asbestos is a very, very difficult one. It technically, is very difficult. It is one thing to say, OK, the permissible exposure level should be half a fiber per cubic centimeter or 0.1, or whatever the rulemaking comes out with. But the technical aspects of how you determine what the level is get very, very complicated.

If I may, I would like to ask Dr. Vance to demonstrate what we mean by that. Just to give you a picture of some of the technical problems. It is really the third leg of the feasibility question. We deal with economic feasibility, technological feasibility, and now we have an enforcement feasibility because of the nature of the measurement of asbestos fibers.

Mr. FRANK. When you say enforcement, you don't mean postpromulgation of the standard enforcement? You are still talking about enforcement in terms of what the standards ought to be?

Mr. AUCHTER. I am talking in terms of what the standard may be after our rulemaking comes out. Just take a look at what Dr. Vance is going to show you here.

Mr. FRANK. Why don't you get a microphone over near by there? Unless this is going to be a silent demonstration.

Mr. VANCE. Thank you, Mr. Chairman.

What we have here is a picture of what an asbestos sample would look like on a microscope slide. This is a fairly typical picture of what—

Mr. FRANK. I wonder if you could just do that from the side?

Mr. VANCE. Certainly.

Mr. Chairman, what we are attempting to do is to illustrate the difficulty that occurs when one carries out a microscopic analysis of an asbestos sample. A slide typically looks like this. The standard regulates exposure to fibers which are 5 microns or longer in length and which have a 3 to 1 length-to-width ratio.

When you look at one of these samples you see an accumulation of dirt. There is a morass of stuff that accumulates on that slide. The sample gets more—

Mr. FRANK. What is that a slide of?

Mr. VANCE. This would be a typical sample of asbestos collected on a filter. The way that one collects a sample is to attach an air pump onto the worker's belt, collect air that is in the breathing zone of the worker, and collect it on a filter. The sample is then placed underneath a microscope and a trained microscopist, a very carefully trained microscopist, examines that slide in order to determine fiber concentration. It takes a lot of skill for that microscopist to carry out his job.

The less asbestos there is in the air, the more difficult the microscopist's job becomes. That is a simple point that we are trying to get across here. As the standard becomes lower and lower, it becomes more and more difficult for the microscopist to get an accurate count of the exact amount of asbestos that is present in the air.

This chart is for the purpose of illustrating that point.

A series of techniques have been developed that are commonly used by all of the asbestos counters in order to attempt to get an accurate count. It is a real art to be able to examine and get correct values for asbestos counts.

These slides at the bottom indicate a grid that a microscopist would examine when he looks through his instrument in order to determine how many fibers there are in that sample.

This fiber, for example, would not be counted. There is a standard technique that is used. Fibers which fall outside of the grid area are not counted. There is a technique for apportioning the count. This fiber entirely in the grid would be counted. This one would be counted as half a fiber. This one as half a fiber.

There are six slides here. The count from this would be two fibers in these six grids. There is a graph, which in the interest of time I won't explain in complete detail unless you are interested, which is used by the industrial hygienist who goes in and collects the sample to determine how long he should run the pump, exactly how he should carry out his collection of the sample.

Sample collection is a key to getting an accurate result. If one collects too long, you end up with a mass of stuff on the filter, which is unreadable. If one collects for too short a time, you end up with an insufficiently large number of fibers to be able to carry out any kind of reasonable analysis.

There have been two major studies that have been done of techniques of measurement. One by NIOSH, one by the Asbestos Information Association, which was just provided to us within the past couple of weeks.

Mr. FRANK. What is the Asbestos Information Association?

Mr. VANCE. It is a private group of asbestos manufacturers. It is an industrial trade group.

Analyses of these studies are a part of our rulemaking as Mr. Auchter just pointed out.

Mr. FRANK. When did the NIOSH study come to you? When was that completed?

Mr. VANCE. The NIOSH study was completed, oh, 4 or 5 years ago.

A comparative analysis of these two will be a part of our work. And as we have said, NIOSH is working with us in the development of this standard. So we will have NIOSH evaluating the private group study as well as the English OSHA officials. This particular problem is one of the major things we are looking at in developing the standard and we expect to have not only some support from NIOSH but also from our international colleagues in occupational safety and health.

Mr. FRANK. In other words, what you are saying is that when you promulgate a standard, one of the things you are taking into account is the enforceability of the standard after promulgation?

Mr. VANCE. Yes, sir.

Mr. FRANK. Without objection, a copy of the chart will be submitted for the record.

[The chart follows:]

Counting Asbestos Fibers

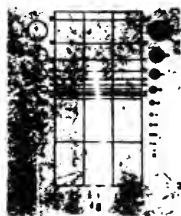


Figure 1. DO NOT COUNT. Fiber crosses both left and right sides.



Figure 2. COUNT. At one fiber.

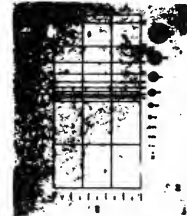


Figure 3. COUNT. At 10 fibers. Fiber crosses between side and one and has within count area.

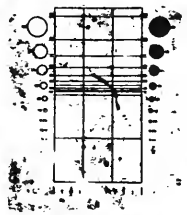


Figure 4. DO NOT COUNT. Fiber crosses two sides.



Figure 5. COUNT. At 10 fibers. Fiber crosses left side and one and has within count area.



Figure 6. DO NOT COUNT. Fiber crosses two sides between left corner.

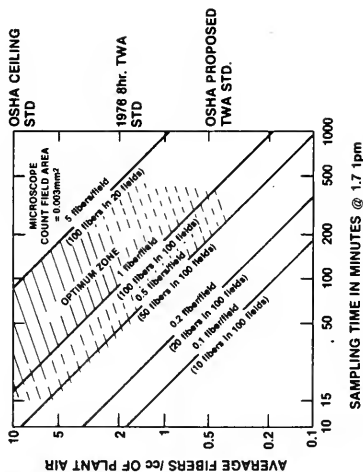


Figure 7. Optimum sampling times for asbestos asbestos where microscope field area = 0.003 mm².

Mr. AUCHTER. As a followup, Dr. Vance was also over at the National Bureau of Standards recently. Relate that experience, Dr. Vance, if you would.

Mr. VANCE. We touched base with all of the relevant Government agencies in developing these standards. We were at the National Bureau of Standards about a month ago talking to the individuals responsible for comparative electron microscopy and phase contrast light microscopy techniques for evaluating asbestos.

The individual responsible for that group told me that one of his counters who is being used in development of the standard, consistently calculated results lower than the rest of the people who were associated with her.

A comment was simply made to that counter that her results were consistently low and for the next 6 months the results were doubled on every slide that this particular individual looked at. The individual counter makes a great deal of difference. Through training they were able to improve the results of that counter's evaluations within a month.

Mr. FRANK. One thing I take from this, Mr. Auchter, is that this is a very difficult one to enforce. I take it, then, that when we get the new standard you are going to ask us for more people to help you enforce it?

Mr. AUCHTER. I would hope not.

Mr. FRANK. You have made a pretty good case. You have told me how tough this is and how difficult it is to train them. If you get a new tougher standard and you don't come back and tell us we need more people to train, I am going to be very skeptical, because it seems to me you have just made a very strong argument for a great increase in enforcement force unless it is your intention for an adequate way to enforce the standard.

Mr. AUCHTER. Mr. Chairman, I guess you better get ready to be skeptical because I am not going to ask you for any more.

Mr. FRANK. How can you give me this demonstration about how difficult this is to enforce—I mean, if the difficulty of enforcement is a factor to be taken into account in delaying the promulgation of the standard, why is it not a fact to be taken into account in enforcing the standard?

Mr. AUCHTER. Mr. Chairman, let's see if I can put this in a little different perspective.

First, this administration has no intention of delaying the promulgation of a regulation. As a matter of fact, we are acting on it and doing it expeditiously.

Second, the people who go out into the workplace, the industrial hygienists who collect the samples, are not the ones involved with this particular problem that we were just discussing.

We do have adequate facilities at our laboratory to do the appropriate job once the regulatory process determines what the appropriate job is.

Mr. FRANK. You don't have a problem, now you say it is difficult to train people and difficult to find the right people. Are you well staffed now to evaluate all the samples that come in?

Mr. AUCHTER. Yes, sir, we are.

Mr. FRANK. And promulgating a newer and more difficult standard is not going to require any increase in the number of people who monitor this at your end?

Mr. AUCHTER. No, sir.

Mr. FRANK. You have got this unused capacity now among these people? If you are going to promulgate a standard that is more difficult to enforce, I don't understand why it is not going to take more resources to enforce it.

Mr. AUCHTER. The question is one of numbers of samples taken. So far we are able to handle comfortably—I think our latest count is about 800 samples a month, and I would suspect that the level will remain something around there for the near future.

Mr. FRANK. But they are more difficult to analyze. What you are saying is that the samples are going to become more difficult to analyze as you get a tougher standard.

Mr. AUCHTER. Depending on what level the permissible exposure level moves to.

Mr. FRANK. I assume the purpose of this was to say we are going to move to a stricter standard. I mean, we have a standard without prejudging what you are going to come up with; we have a standard that everybody, NIOSH, I assume everybody thinks is too high right now. So when we get to a stricter standard, it is going to make it more difficult to analyze. I totally miss the point of that demonstration.

I didn't study science—I guess I was a little better in science than the President but not a lot, as I remember his comment in Tennessee. But I think I grasp the point of that demonstration.

You say that you are moving quickly. I am a little disturbed. I have copy of some correspondence between yourselves and people from the AFL-CIO. Mr. Taylor wrote you in March, you responded to Mr. Samuels a month or so later and said, you are going to move up the timetable. I am glad that the timetable is being moved up but I guess I am curious as to why it was such a leisurely timetable for the first 2 years.

We had this inadequate standard. I don't know why there wasn't movement in the prior two administrations, there should have been. You took office and for the first 2 years of your administration your timetable was the summer of 1984. Now you are moving it to the summer of 1983. I would have thought the nature of the health hazard here would have led to an earlier date from the very beginning.

Mr. AUCHTER. Once again, Mr. Chairman, OSHA did not have a cohesive policy on the development of a new asbestos standard. And it was sometime after I had taken office that I did get together with the Director of Health Standards and put that preliminary team together.

The purpose of the previous demonstration was to show you that it is a very complicated issue at every level and that appropriate rulemaking we believe is the way to handle that and get as much information as possible.

Mr. FRANK. I understand. But there is also, of course, the fact that while we are doing this, people are being exposed to the health hazard.

What about the question of an emergency standard pending the adoption of the final one?

Your timetable for the new standard is won now. We have got a rulemaking this summer, when will the new standard be promulgated?

Mr. AUCHTER. We expect to have a lower permissible exposure level by the first of next year, or by the end of this year, whichever way you want to look at it. We believe we can meet that timetable.

Mr. FRANK. You don't think there is any basis for an emergency standard between now and then?

Mr. AUCHTER. No, sir, I do not.

Mr. FRANK. Are we talking now about new installations when you talk about the lowered standard? Obviously, we have got a problem, especially when things are already there. We have got a standard admittedly too high.

What would be the harm in having a temporary emergency standard that was lower pending the promulgation of the new one in January?

Mr. AUCHTER. We don't believe it would be enforceable.

Mr. FRANK. Why wouldn't it be enforceable?

Mr. AUCHTER. Because the employee exposure information that is necessary for us to have, we simply do not have today. From the information we have, we believe that employees are exposed well below the 2-fiber level in any case.

Mr. FRANK. What is that based on? Let me go back a step.

When you said you don't have the employee information exposure, why not? Whose responsibility is it for you to get that? You are saying that you don't now know what people are being exposed to?

Mr. AUCHTER. Mr. Chairman, our current PEL is 2 fibers.

Mr. FRANK. That is the permitted exposure level?

Mr. AUCHTER. Yes, sir.

In OSHA's history, OSHA has attempted to promulgate, I believe, nine emergency temporary standards. Of the five of those standards that were challenged in court, four were overturned.

Mr. FRANK. Before we get to the court, let's get to the question which I am concerned about and that is where you said that you don't really have the information. I think you said you don't know now what the employee exposure level is? I mean, if you don't, who does? Aren't you supposed to?

Mr. AUCHTER. We will after rulemaking.

Mr. FRANK. But you have got a rule now. Why don't you now?

There is a standard now on the books. People all say it is inadequate. But you are telling me that you won't get the information until you get a new rule. Shouldn't you have that now? I mean, how are you enforcing the current rule?

Mr. AUCHTER. We compile that information through contractor studies, going to various industry groups, organized labor, and so forth, and look for exposure information. It is part of the rulemaking process.

Mr. FRANK. You don't do any of it on your own right now in terms of enforcement?

Mr. AUCHTER. No, sir; we would not be gathering that exposure level activity—we would not be doing that unless we were in rulemaking to gather that on an industry-by-industry basis.

Mr. FRANK. What kind of enforcement can you do if you don't have that kind of data? I would have thought that would have been important to the enforcement?

Mr. AUCHTER. Our enforcement activities are based on our health standards program—our health inspection program. Our industrial hygienists go into the workplace and collect samples. They do that based on the sort of materials they believe might be in use or available in a particular workplace.

Mr. FRANK. Are they doing that now?

Mr. AUCHTER. Yes, sir.

Mr. FRANK. I thought, you said, you don't have information on the exposure level of employees? If your people are getting it, why don't you—

Mr. AUCHTER. In order for us to promulgate an emergency temporary standard and have it be upheld in court, we have to show a couple of things. One, we have to show a major emergency in the workplace—something new has occurred out there.

Second, we have to say and document the fact that there are significant numbers of employees exposed. We have no such documentation available to us today.

Mr. FRANK. You have no means of getting it? You took office and paid NIOSH and others, there was an exposure level was too high don't you think that should have been dealt with earlier? It has been 2½ years now. I guess I don't understand why you don't have the information. Have you tried to get it?

Mr. AUCHTER. That is part of the preliminary work our team has been doing.

Mr. FRANK. Starting when? When did they start getting it?

Mr. AUCHTER. Last year. Spring of last year.

Mr. FRANK. How long is it going to take them for you to have an adequate standard—an adequate basis of information?

Mr. AUCHTER. We will gather more from this rulemaking, from the hearing that we are going to request from the public. Then we will incorporate that in our final decision prior to the end of this year.

Mr. FRANK. Again, we have a health hazard here and a standard that is too high. Why wasn't there an effort to gather that information earlier? I would have expected that.

Mr. AUCHTER. Well, the effort is a lengthy one, Mr. Chairman.

Mr. FRANK. I understand that, but you are telling me that the rulemaking process is the process in which you are going to get much of this information.

Mr. AUCHTER. Yes, sir.

Mr. FRANK. Up until April of this year, you were shooting for a rulemaking process in the summer of 1984. That suggests to me that we were not moving as expeditiously to get that information as we could have. A couple of years have gone by, it is a little bit of a catch-22, you can't do an emergency standard because you don't have the information but you don't have the information because you weren't trying to get it until the summer of 1984.

Up until April, your timetable for the rulemaking was the summer of 1984. What you are telling me is that, therefore——

Mr. AUCHTER. A final rule, 1985.

Mr. FRANK. Yes. Therefore you were, delayed, in terms of gathering the information. I think the argument that you can't do an emergency rule because you didn't have the information is based in part by the fact that you didn't try to get the information until fairly recently.

Mr. AUCHTER. Mr. Chairman, OSHA does not believe at this time that an emergency temporary standard is the appropriate action to take here, for a number of reasons. And I can go into more detail——

Mr. FRANK. Then why are you moving this up 1 year? Why have you changed your original timetable to go a year earlier in promulgating a——

Mr. AUCHTER. An emergency temporary standard violates the public's right to be involved in the rulemaking process. As we demonstrated earlier, on just that one subject, the regulation of asbestos is a very, very complicated and difficult issue.

We believe very strongly the public should be involved in that. An emergency temporary standard is only good for 6 months.

Mr. FRANK. To get you to the new rulemaking period.

Mr. AUCHTER. We have 6 months between now and the end of the year, which is our target for a final rule with complete public input. So we believe that the action that we have taken is the most appropriate and a fair balance between the public's right to be involved in the process and timeliness.

Mr. FRANK. Let me ask you. A recent report from Business Week, stated that industry opposition to stricter exposure rules is fierce. And that OSHA aides suspect that skeptical Office of Management and Budget officials may team up with industry officials and try to kill the proposal.

Is Business Week here engaging in some kind of a radical demagoguery in suggesting that industry is opposing the stricter standards? What kind of cooperation are you getting from industry?

Mr. AUCHTER. We are getting a lot of cooperation so far and I would anticipate that that will be the case throughout.

Our standards activity today tries to have involved, and we believe does involve, interested parties at very early stages.

Mr. FRANK. So what Business Week reported in the July 4 issue, Washington Outlook, that industry opposition to stricter exposure rules is fierce, are they incorrect?

Mr. AUCHTER. They are incorrect as far as OSHA is concerned.

Mr. FRANK. That's who they are talking about. I don't think the State Department is having too much problem with the question of asbestos.

The timetable is rulemaking this summer, new rule by January 1984, is the hope?

Mr. AUCHTER. Yes, sir.

Mr. FRANK. And you expect it to be in lower without prejudicing exactly what your——

Mr. AUCHTER. Yes, sir; we do.

Mr. FRANK. Then the question will be what is the form of enforcement?

Let me just ask the last question.

The new rule is on the permissible exposure level. Is there any thought being given to changing the level at which monitoring has become controversial, for instance, because the Department of Defense, was refusing to follow OSHA's promulgation with regard to monitoring, charging that you had mispromulgated it, or that it had been mispromulgated in the previous administration and that mispromulgation hasn't been corrected.

The Department of Defense now tells us they are going to comply with your monitoring rule.

Are you planning to deal with the monitoring question at all?

Mr. AUCHTER. Not in this rulemaking. This rulemaking is targeted toward the question of the permissible exposure level. We will do a supplemental rulemaking, another part of the rulemaking that will address other issues. This will be one of them, and other things might be the work practice control methodology, and so forth.

Mr. FRANK. The monitoring seems to be important and and you reinforce here in what you say today because we are not dealing with something where you can push a button and know exactly what you have to know.

So that given the very difficulties of enforcement that you talk about, that seems to me to strengthen the case for the workers themselves and others to have the monitoring.

Have you got a timetable on the new monitoring rule?

Mr. AUCHTER. I am informed that we are looking at a target date on a final rule for that by the end of next summer.

So our first rulemaking will address the PEL, by the end of this year, and then August or so 1984 is our target date to wrap up the rest of the rulemaking.

We have to do that following the Administrative Procedure Act since the 1975 rulemaking is our basis for the approach on the permissible exposure level.

Mr. FRANK. Let me touch on that point further. We are going to have some further hearings on this but I was very disappointed to find out until recently that the Department of Defense was refusing to follow OSHA's rules in this regard. With regard to the Kittery Naval Base, the Navy was out of compliance. But then when they agreed to comply in one regard with the question of access to medical records, I guess it was not on the monitoring standard. They agreed to comply early with the monitoring standard.

But on the question of employee access to records, the Department of Defense told me that they thought OSHA simply did not have the right to enforce a standard which you promulgated. You have a standard now in effect that you inherited but you have been administering to other Federal agencies on what they should do. The Department of Defense is taking the position that you are wrong, that the wrong section was cited, and they are not going to follow it.

I wonder if that has come to your attention or whether you will be able to address that at all.

Mr. AUCHTER. Mr. Chairman, the access standard was litigated and upheld.

Mr. FRANK. When was it upheld?

Mr. VANCE. About 3 or 4 months ago by a Federal district court in Louisiana. It has been litigated before the——

Mr. FRANK. Can I say, sir, having informed first Mr. Auchter and then myself, would you put the Defense Department on your list of people to share that information with? Because I will tell you that later than the time you told me—April 18—that is not the beginning of a Longfellow poem. On April 18, the Defense Department said to me that they weren't going to follow that standard. That you had made a mistake and they weren't covered.

Now, since it was what—a district court in Louisiana. I assume they will be taking the position that they are not covered. It seems to me unseemly, I must say, in the highest degree, for the Defense Department to be saying just because one Federal district judge in Louisiana said that OSHA's standard was legitimate, that doesn't mean that they have to abide by me.

They have recently indicated some willingness to abide. But there was apparently a serious problem with other Federal agencies claiming that they are not covered.

I have written to the White House on that. I would like very much to be supportive of the OSHA position. The notion that we tell private sector companies that they have to do X and Y, Federal agencies, in identical circumstances, don't do the same thing. I think it is a terrible problem.

I hope you will be in touch with the Defense Department, maybe through the Cabinet level or whatever, because that is something which has to be resolved.

I can tell you as a matter of fact that the Defense Department told me subsequent to that court decision, that they had no intention of complying with that particular rule.

Mr. AUCHTER. Mr. Chairman, I would agree with you. OSHA's philosophy today is that the Federal Government should enjoy the same privileges that the private sector enjoys.

So our philosophy is to apply enforcement where necessary in the Federal sector, and consultation, training and education, standards activity, and the other things that we do in the private sector. We will pursue this question.

Mr. FRANK. You can tell them, Mr. Auchter, if it would help, and I think it might, that I intend later this summer to have a hearing on the question of the other Federal agencies' compliance with your rules and regulations.

I would be expecting you to come and give me the list who are out of compliance. If we have to take that up with their authorizing and appropriating committees, we will do it. I don't think any of us want to tolerate that kind of situation.

Mr. AUCHTER. Mr. Chairman, the President has the same approach, by the way. He has signed off just recently—I made a presentation to the President and the Cabinet Council on our Federal agencies program and the President is in the process of sending a memo out to his agency heads for a 3-percent annual reduction as a target over a 5-year period—3 percent per year for 5 years—of the injury and illness incidence rates in the Federal Government.

So we are focusing in on this. We mean business and we expect positive results.

Mr. FRANK. Thank you.

I wrote to the President, along with Mr. McKernan, I believe, a couple of months ago, and we are still waiting for the kind of decisive response that we ought to get, which is that these shouldn't be a matter of quibble, they ought to be ordered, all of them, to comply. And if they want to take some appeal through intra-administration processes, fine. But once the decision has been made, they ought to abide by it.

Thank you very much, Mr. Auchter.

Mr. AUCHTER. Thank you.

Mr. FRANK. Our next witness is John McKinney, chairman and chief executive officer, the Manville Corp. Proceed, Mr. McKinney.

STATEMENT OF JOHN A. McKINNEY, CHAIRMAN OF THE BOARD AND CHIEF EXECUTIVE OFFICER, MANVILLE CORP., ACCOMPANIED BY JOHN LONNQUIST, DIRECTOR, WASHINGTON PUBLIC AFFAIRS OFFICE, AND DENNIS MARKUSSON, ASSISTANT CORPORATE COUNSEL

Mr. McKINNEY. Mr. Chairman, accompanying me this morning are Mr. John Lonnquist, on my right, who is director of the corporation's Washington public affairs office; and on my left, Mr. Dennis Markusson, who is assistant corporate counsel for the corporation.

We are pleased to appear before the subcommittee this morning in its continuing investigation of the cost and benefits associated with regulatory structures in place in the country today.

First, I would like to make a comment. Whether or not market forces caused it, before 1938 when the U.S. Public Health Service made its standard and recommendation, industry had already underwritten medical studies and at least a portion of industry had made substantial changes in work practices, such as wearing of respirators and installing of dust-control equipment.

I would like to talk this morning of the use of asbestos by the Navy under Government regulation because this will illustrate what you have heard and commented on, although I will amplify it a little. But the question is not so much whether you have a regulation but whether or not the regulation or standard is enforced.

For decades, the Government and principally the U.S. Navy, failed to observe and enforce recommendations and regulations for the safe handling of asbestos-containing materials in America's shipyards.

As a direct result of this failure, thousands of Americans presently suffer from asbestos-related occupational diseases, and medical researchers predict that thousands more will suffer in future years.

At present, over 20,000 individuals have filed lawsuits in our Federal and State courts seeking compensation for asbestos-related occupational diseases.

Almost half of those lawsuits are brought by individuals who were exposed to asbestos or asbestos-containing materials in the U.S. Navy or Navy-controlled shipyards, and not more than a handful of these have been adequately or fairly compensated. Because of the Government's immunity to suit, these actions are not brought against the United States of America but, rather, against

the companies which supplied the Government specified asbestos-containing products to the Navy.

Already three companies, including my own, have been compelled to file for chapter 11 reorganization as a result of the crushing and unwarranted economic burden these lawsuits have imposed.

Mr. Chairman, I have filed with the subcommittee extensive written remarks detailing and documenting with Government documents the Navy's failure to control shipyard asbestos exposures. I would ask that my written statement be included in the record of this hearing and that it receive the subcommittee's full attention.

Mr. FRANK. It will be so included.

Mr. McKINNEY. I would add that with each passing week our investigations reveal additional evidence of the Navy's disregard for excessive exposures in this Nation's shipyards.

Let me briefly summarize some of the important facts. By the time of our entry into World War II, the U.S. Navy and the U.S. Maritime Commission determined that asbestos and asbestos-containing products were of critical importance to our naval and merchant fleet. Asbestos-containing materials were lightweight thus increasing ship's speed, were excellent insulators, and most important, were fireproof, thus protecting against fire, the great hazard at sea.

All of these properties became even more important with the advent of World War II. The Navy specified asbestos-containing products as strategic and critical materials to be incorporated in our rapidly expanding naval fleet.

In fact, continuing as late as 1979, one simply could not construct a U.S. naval vessel with the Government's mandated specifications without the use of asbestos-containing products.

Asbestos has served this country well as a strategic and critical material but as with many valuable materials, asbestos can cause physical harm if excessive occupational exposures are permitted.

It has already been referred to that as early as 1938, the U.S. Public Health Service recognized this potential hazard and published a recommended "safe" standard for asbestos exposure.

This standard was adopted by the American Conference of Governmental Industrial Hygienists by industry, by State and local governments, and by the Navy.

Tragically, the Navy, while ever increasing its demand for raw asbestos and asbestos-containing products as strategic and critical materials, disregarded the necessity of controlling asbestos exposures to levels below those recommended by the U.S. Public Health Service in the shipyards it operated and controlled.

It is clear from recently declassified Navy documents that during World War II asbestos exposures in the Navy shipyards were excessive and that these facts were known to high level naval officers.

For example, in March 1941, shipyard asbestos exposures in excess of Public Health Service recommendations were reported to the Surgeon General of the Navy, nor were the failures to adhere to the Public Health Service recommendations freak occurrences.

A reexamination of the Bath, Maine shipyard some 2 years after first finding excessive asbestos exposures disclosed that exposures

continued at levels 6 to 10 times the Public Health Service recommendation.

It is in these excessive exposures that the present-day asbestos disease crisis had its genesis. In short, existing standards and regulations were neither followed or enforced.

I wish I could report to the subcommittee that the massive over-exposures to asbestos which the Navy chose to tolerate in the shipyards were only a phenomena of World War II. However, as detailed in my written remarks, such was not the case.

Even after 1964, when medical developments indicated that the previous U.S. Public Health standard was, in fact, not safe, the Navy Bureau of Medicine continued to utilize the obsolete standard for another 8 years.

I believe the subcommittee has found similar evidence in the course of its recent hearings regarding the Portsmouth-Kittery Shipyard. Simply stated, the Navy chose to specify and utilize asbestos-containing products as a critical and strategic material necessary for the Nation's defense while at the same time, disregarding known medical and industrial hygiene standards relating to asbestos exposure.

The tragic consequence of the Navy's action of past decades is thousands of asbestos-related disease cases.

The Federal Government's long and irresponsible history in the asbestos tragedy that the Nation faces today does not speak well for our collective commitment to continued development and enforcement of sound regulatory practices, particularly within the government's own operations.

In terms of this subcommittee's specific inquiry, one can only roughly quantify that impact and provisionally arrive at estimates of costs to be incurred as a result of the Government's failure to enforce known standards or regulations.

There is, of course, the unquantifiable cost in human health together with the millions of dollars being expended in asbestos litigation pending in the Nation's courts.

There can be no doubt that additional attention is needed to the timely development and strict enforcement of industrial hygiene standards in government operations such as naval shipyards. However, the tragedy of the past must also be addressed.

Manville and others in the asbestos industry are prepared to do their fair share of the task of compensating workers injured by the use of asbestos products. But the private sector should not be called upon to shoulder the burden created by decades of government neglect.

Based upon the evidence this subcommittee and other congressional committees have already received, it is clear that the Federal Government must also come forward and fully and fairly accept responsibility for its past actions. Present Federal programs, including Federal Worker's Compensation, do not meet this goal.

Mr. Chairman, that concludes my remarks this morning and we would be happy to answer any questions the subcommittee may have.

[Mr. McKinney's prepared statement follows:]

STATEMENT OF
JOHN A. MCKINNEY
CHAIRMAN OF THE BOARD AND
CHIEF EXECUTIVE OFFICER
MANVILLE CORPORATION

BEFORE THE
SUBCOMMITTEE ON MANPOWER AND HOUSING
U.S. HOUSE OF REPRESENTATIVES

JUNE 28, 1983

Good morning, Mr. Chairman. My name is John A. McKinney. I am Chairman of the Board and Chief Executive Officer of the Manville Corporation. Accompanying me this morning is Mr. John Lonnquist, Director of the Corporation's Washington Public Affairs Office, and Mr. Dennis Markusson, Assistant Corporate Counsel for the Corporation. We are pleased to appear before the Subcommittee this morning in its continuing investigation of the costs and benefits associated with the regulatory structures in place in the country today.

It is particularly fitting, Mr. Chairman, that this morning's deliberations are focused on asbestos. For decades, the government and principally the United

States Navy failed to observe and enforce recommendations and regulations for the safe handling of asbestos-containing materials in America's shipyards. As a direct result of this failure, thousands of Americans presently suffer from asbestos-related occupational diseases, and medical researchers predict that thousands more will suffer in future years. At present, over 20,000 individuals have filed lawsuits in our Federal and State courts seeking compensation for asbestos-related occupational injuries. Almost half of those lawsuits are brought by individuals who were exposed to asbestos or asbestos-containing materials in U.S. Navy or Navy-controlled shipyards.

However, because of the government's immunity to suit, these actions are not brought against the United States of America, but rather against the companies who supplied government specified asbestos-containing products to the Navy. Already three companies, including my own, have been compelled to file for Chapter 11 Reorganization as a result of the crushing burden these lawsuits have imposed.

Mr. Chairman, Manville Corporation does not contend that the asbestos litigation crisis facing the nation today is the sole result of a failure to regulate per se.

Throughout the course of events that has led to the cases of disease we see today, evolving medical knowledge was utilized, advanced, and codified. As early as 1935, the United States Public Health Service (USPHS) was publishing research on asbestos diseases; in 1938, U.S.P.H.S. did its own research and concluded that if dust counts could be held below 5 million particles per cubic foot (5mppcf), no new cases of asbestosis would be anticipated. The American Conference of Governmental Industrial Hygienists endorsed this "standard" and it was adopted and relied upon by both government and industry.

Why, then, is there so much asbestos-related disease, and why do the doctors anticipate thousands of cases in future years? The answer is three-fold.

First, medical science has subsequently learned that the 1938 5mppcf standard recommended by the U.S. Public Health Service and endorsed for decades by the American Conference of Governmental Industrial Hygienists was too high to protect the workers.

Second, it has recently been learned that the Public Health Service standard, although adopted by the Navy, was not regularly enforced in Navy or Navy-controlled

shipyards, resulting in the massive over-exposure to asbestos for thousands of American shipyard workers. These facts were known only within the government until very recently.

Third, even after it was established in 1964 that the USPHS 5mppcf standard was too high, the Navy nevertheless continued to utilize that obsolete standard in its shipyard regulations for the next eight years. The result was to virtually guarantee excessive asbestos exposures for workers employed in Navy or Navy-controlled shipyards.

So, in the asbestos cases, Mr. Chairman, the problem is not only a failure to regulate, but principally a failure to enforce existing recommendations and regulations. The asbestos cases are textbook examples of the federal government saying "Do as I say, not as I do", with the most deadly of consequences.

I hasten to add, Mr. Chairman, that the government's failure to control asbestos exposures is not restricted to any one political party or Administration. As the Subcommittee is aware, asbestos-related diseases have a latency period of between fifteen and forty years. The disease cases we see today are the results of exposures

that occurred as long ago as World War II. However, as the Subcommittee found in the course of its recent hearings regarding the Portsmouth-Kittery shipyard, the Navy continues to expose its workforce to excessive asbestos concentrations, even today. In essence, the federal government continues to generate asbestos disease cases for which private industry will undoubtedly be blamed!

Mr. Chairman, let me be more specific regarding some of the background and facts surrounding the Navy's failure to enforce asbestos exposure standards in its shipyards and shipyards which it controlled. During World War II asbestos was classified as a strategic and critical mineral necessary to the defense of the nation, and assigned an "AA" Preference Rating. At that time and, in fact, continuing as late as 1979, one simply could not construct a United States Naval vessel to the government's required specifications without the use of asbestos-containing products.

All shipbuilding in the United States during the World War II era required vast quantities of asbestos products in order to meet the government's stringent requirements for seaworthiness and safety in the event of fire. Commencing with the issuance of Section 944.2 of the

Office of Production Management's "Regulations Applicable to the Operation of the Priorities System" and continuing throughout World War II, Manville and other asbestos product manufacturers were required to accept any Defense Orders for any material, and to fulfill any such Orders received "in preference to any other contracts or purchase orders for such Material." The practical effect of these federal regulations upon Manville was such that our entire business was being operated, in a first priority sense, for the direct benefit of the U.S. Government. By April, 1942, over 70% of Manville's total industrial production was devoted to war-related output.

It is significant to point out, Mr. Chairman, that a substantial quantity of the asbestos products supplied to the Navy during the War contained African asbestos. The African asbestos utilized was NOT mined by Manville or any of the manufacturing companies currently defending asbestos lawsuits brought by individuals who worked in Navy or Navy-controlled shipyards. One type of African asbestos is amosite. The United States determined that this particular type of asbestos fiber was best suited to its unique and pressing military requirements, and the U.S. Government itself was the purchaser and supplier of this asbestos. Illustrative

of the high priority which the United States attached to its own market activities in amosite asbestos is a Memorandum of Understanding entered into between the United States of America and Great Britain. Signed in early 1943, the arrangement between the two countries was designed to apportion all supplies of "African asbestos" between them so as to best further their shared military vessel construction and repair objectives.

What happened to this government-supplied asbestos fiber? Under the Priorities System in effect, the government strictly allocated its asbestos fiber to private companies such as Manville for the manufacture of strategic military products, which in turn were delivered to government-owned or government-controlled shipyards for installation in new vessels or ships under repair. It may be of interest to the Subcommittee that the government realized a five per cent (5%) net profit on these transactions.

At the same time the government was selling African fiber to manufacturers to be processed into military products to be utilized in the shipyards, it is clear that the U.S. Government knew that the working conditions in its shipyards were generating levels of

asbestos dust far in excess of U.S. Public Health Service recommended standards. The present-day asbestos disease crisis has its genesis in these hazardous wartime exposures.

As previously stated, Mr. Chairman, in 1938, the U.S. Public Health Service had concluded that if dust exposures were held below 5 million particles per cubic foot, no new cases of asbestosis would be anticipated. And, as early as 1939, Admiral McIntire, Surgeon General of the Navy and President Roosevelt's personal physician, recognized that excessive asbestos exposures were occurring in the shipyards. He reported to the Secretary of the Navy that continued exposures to present occupational conditions in the shipyards would not preclude future development of asbestosis.

In a March 11, 1941, memorandum to Admiral McIntire, Commander Stephenson, the medical officer in charge of the U.S. Navy's Division of Preventive Medicine advised that Navy shipyard workers were, in fact, being exposed to concentrations of asbestos dust in excess of U.S.P.H.S. recommendations. After indicating that President Roosevelt opposed a Public Health Service request to independently survey the shipyards because "they might cause a disturbance in the labor element," the Commander wrote:

(1) Asbestosis. We are having considerable amount of work done in asbestos and from my observations, I am certain that we are not protecting the men as we should. This is a matter of official report from several of our Navy yards.

The general state of working conditions in the Navy shipyards at that time is further evidenced by Commander Stephenson's observations concerning the existence of another occupational dust hazard:

None of our foundries would pass the necessary inspection to obtain workers' compensation insurance from any of the insurance organizations. I doubt if any of our foundries would be tolerated if the state industrial health people were to make surveys of them.

Were these just freak occurrences? The unfolding evidence is to the contrary. A September, 1942, internal Health Survey of the Bath Ironworks shipyard in Maine conducted jointly by the U.S. Navy - U.S. Maritime Commission discloses:

The conditions in this shop present a very real asbestosis hazard and immediate steps should be taken to segregate the most dusty processes into a well ventilated area.

Returning to the same shipyard for follow-up study a little over two years later the Navy measured dust counts at between 34 million and 52 million particles, or between six and ten times higher than the known and accepted government standard for "safe" exposure levels!

With dust counts at these excessive levels, it is clear that the U.S. Government must have known it was countenancing a potential occupational health hazard for thousands of shipyard workers. It is similarly clear that little, if any, information regarding exposure levels in the shipyards was ever communicated by the Navy to any of its suppliers or contractors. The Industrial Health Surveys from which I have quoted were treated as confidential and disclosure was expressly restricted by the provisions of the Espionage Act. These wartime reports continued in classified or restricted status for decades and were certainly not available for the guidance of manufacturers or the public or industrial health communities during the years when injurious shipyards exposures were occurring.

While the government's seeming disregard for excessive shipyard exposures to asbestos may in some manner be understandable, by the overriding need to fight World War II, its behavior in the post-War years is not. Examples of post-war neglect are abundant:

In the early 1950's, shipyard workers were being exposed to amounts of asbestos dust from rip-outs in excess of the U.S.P.H.S./American Conference of Governmental Industrial Hygienist's and Navy standards. (See, "Estimates of Asbestos Concentration in Long Beach Naval Shipyard" 2-3, Letter of Commanding Officer of Naval Regional Medical Center to Commander, May 8, 1979)

In May-June, 1964, workers were exposed to hazardous levels of asbestos dust at the Long Beach Naval Shipyard, and adequate ventilation for worker protection was not possible with the equipment at the shipyard. (See, Survey of William Marr, Chief Industrial Hygienist at the Long Beach Naval Shipyards, T/P Exh. 146, Glover v. Johns-Manville Corp. v. United States of America)

In March, 1968, workers were being exposed to asbestos dust concentrations above the current threshold limit value during shipboard operations, without provision of adequate ventilation and other workplace precautions, at the San Francisco Bay Naval Shipyards. (See Rep. No. 68-5, San Francisco Bay Naval Shipyard Industrial Hygiene Division, Industrial Health Survey of Pipecoverers' Asbestos Exposures, Hunter's Point Site 3-5, March 29, 1968)

In 1969, in every government and contract shipyard surveyed, it was found that although yard management was aware of the asbestos dust hazard, it had generally failed to exercise sufficient care necessary to abate the problem and failed to enforce the use of respirators by shipyard workers. (See, Survey of Hazards of Asbestos, Final Report of Officer in Charge, Naval Ship Engineering Center, Philadelphia Division, Project FA-287, September 24, 1969)

The Government's conduct in this matter is impossible to rationalize in the post-1964 era, for it was at that time that Dr. Irving Selikoff's landmark findings were released and a demonstrable risk of disease for workers exposed to asbestos-containing insulation materials was established, and the USPHS 5mppcf standard rendered obsolete.

Mr. Chairman, it is particularly interesting to note the different responses that Dr. Selikoff's 1964 findings elicited from industry and the government. Where the private sector, led by the Johns-Manville Corporation, began to voluntarily place a warning label on its asbestos insulation products, the government undertook no such warning program. It wasn't until June, 1973, that the Navy issued BUMED Instruction 6260.14, requiring for the first time the posting of caution signs and specifying the use of warnings for asbestos products. And, as late as the summer of 1972 Navy BUMED instruction 6270.3E continued to use 5mppcf as the appropriate asbestos exposure standard for Navy shipyards in spite of the Selikoff findings of some eight years earlier. These are classic examples of the Navy failing to change its regulations to adapt to new medical information.

Moreover, the Navy was not implementing effective industrial hygiene programs for its shipyard workforce. Mr. Sheldon Manning, Industrial Hygienist at the Long Beach Naval Shipyard, made these observations regarding the industrial hygiene program at Long Beach in a June 30, 1970, memorandum to the Commander of the Yard:

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The Industrial Hygiene program at the Long Beach Naval Shipyard since the second opening of the billet in 1951 has been nonexistent, or marked by weakness whenever the billet was filled.....

...in 1958 Bill Marr was recruited from the Naval Gun Factory in Washington, D.C. and served (as yard Industrial Hygienist) until the end of 1964. His program lacked support, with little equipment and no secretarial help....Before he left for Panama [in 1964], Mr. Marr gave an interview to a reporter on the hazards of asbestos exposure which reflected adversely on the Shipyard. This bad publicity incurred the wrath of the Shipyard Commander and soon afterward the Industrial Hygiene billet was abolished. After a lapse of two years the billet was reinstated.

It was the Medical Officers' wish that all reports be delivered verbally. All actions were to be cleared by him. The most valuable service that an Industrial Hygiene Program can render is the recognition, evaluation and control of health hazards at the work site. This is to be reported to cognizant supervision in a clear concise written report that may be of a technical nature with enclosed data. The written report allows the recipient to refer to it later and offers less chance for misunderstanding. The program was effectively suppressed by this and other tactics [the Medical Officers' insistence on verbal reports only]. It was the feeling of the incumbent that the Medical Officer did not really want an Industrial Hygienist except for window dressing...

During all this time, Navy contracts continued to require asbestos-containing materials for use in construction and repair of Navy vessels until 1975 (ten years after the Selikoff findings) when the policy was amended to require the substitution of asbestos-free products wherever possible (NAVSEA Instruction 5100.24,

October, 1975). The reason given by Navy Vice Admiral T.J. Bigley for the delay was that an overall Navy policy prohibiting the use of asbestos could not be promulgated until the thousands of pounds of government asbestos stockpiled in government warehouses were either sold, used, or adequate substitutes obtained. (See, Letter from T.J. Bigley, Vice Admiral, U.S. Navy, to Robert F. Hughes, Assistant Director, General Accounting Office, January 5, 1979). Embarrassingly, in addition to delaying the implementation of regulations governing Navy uses of asbestos products until it had sold its own stockpiled inventory to the private sector, government memoranda disclose that the Justice Department and the Navy actually discussed making "asbestos fodder" out of their own employees -- that is, using federal employees to handle the asbestos which the government sold. The stated rationale for this option was to insulate the government from liability: injured federal employees may seek FECA benefits, but may not sue the government in tort. (See, Memoranda for Record by Bruce Kasker, Assistant Counsel, Defense Property Disposal Administration, Subject: Asbestos; December 19, 1977, December 30, 1977, January 4, 1978, January 28, 1978, April 14, 1978, and June 28, 1978. See also, Memorandum for the Record, May 8, 1978, by George B. Seeberg, Safety Director)

In short, Mr. Chairman, the federal government's long and irresponsible history in the asbestos tragedy that the nation faces today does not speak well for our collective commitment to the continued development and enforcement of sound regulatory practices, particularly within the government's own operations. In terms of this Subcommittee's specific inquiry, one can only roughly quantify that impact, and provisionally arrive at estimates of costs to be incurred as a result of the government's failure to enforce known standards or regulations.

First and foremost, there is the unquantifiable cost in human health. As I have indicated, had the government but enforced the minimum exposure standards it knew were necessary, untold numbers of these workers probably would not have suffered injury.

Second, we know that almost one-half of all third-party lawsuits filed against asbestos product manufacturers are brought by workers who were exposed in government-owned or government-controlled shipyards. The total relief requested from Manville in these lawsuits is approximately \$45 billion. The direct, quantifiable impact upon Manville and other manufacturers of the government's failure could run as high as 50% of this figure. This is only for the

presently pending claims and does not take into account any future claims. The ultimate total could be several magnitudes greater.

Third, there are substantial costs already being incurred by the federal government as a result of its historically lax approach to asbestos health. These include financial responsibility under the Federal Employees Compensation Act for benefit payments to federal employees with asbestos disability claims.

And fourth, there are a vast number of federal and private sector dollars expended and needlessly wasted on administrative, transaction and legal costs due to the absence of a more rational and equitable system of compensation for asbestos-related disease claimants with the full participation by both industry and government.

In this regard, Mr. Chairman, the prestigious Urban Institute released a study this past March that is relevant to the Subcommittee's investigations. Entitled "Compensation for Victims of Asbestos-Related Diseases: Potential Cost Savings for the Federal Government" the report concludes that a legislated compensation program for asbestos claimants could result in substantial savings to the government. These savings would derive

primarily from the "opportunity savings" that would inure to the federal judicial system by removing asbestos health disputes from the courts -- savings estimated conservatively at \$40 million annually. An additional \$19-30 million annually would be saved in federal income transfer payments if an asbestos compensation program were enacted. Mr. Chairman, I would ask that the full Urban Institute report which I have cited be included in the record of this hearing.

There can be no doubt, Mr. Chairman, but that a substantial number of workers have been injured as a result of excessive asbestos exposures. Manville Corporation and other responsible members of the asbestos industry have sought for years to place this issue on the national agenda, and to find an equitable system through which to provide prompt and adequate compensation to those workers who suffer asbestos-related disability. I remain hopeful that the Congress will act in this area, and in that regard I am encouraged that Chairman George Miller and the House Labor Standards Subcommittee has made this issue a priority concern. I believe, Mr. Chairman, that your Subcommittee's investigation today, and your earlier hearing in Kittery, establishes again that the federal government itself bears a substantial responsibility for

the asbestos disease cases we are confronting today, and for many of the cases we will encounter in the foreseeable future. Manville and others in the asbestos industry are prepared to voluntarily shoulder their fair share of the burden for compensating workers injured by the use of asbestos products, and based upon the evidence this Subcommittee has already received, it is clear that the federal government must now come forward and accept its fair share as well.

Mr. Chairman, that concludes my remarks this morning. We would be happy to answer any questions that the Subcommittee may have.

Mr. FRANK. Thank you, Mr. McKinney.

In your testimony you refer to the 1938 U.S. Public Health Service proposal of 5 million particles per cubic foot, and you say that it was adopted and relied upon by both government and industry that really is at variance with the suggestions we have heard earlier.

Now I know that there is a separate point as to whether or not that was too high and it appears to have been too high.

But was there in fact widespread voluntary compliance with that standard from 1938 on?

Mr. McKINNEY. There certainly was in the part of industry that we know about.

Mr. FRANK. I would be interested if you could submit some documentation on that for me. I mean, when people began from 1938 on to restrict the use of asbestos to the 5 million particles per cubic foot.

Mr. McKINNEY. Would you like to comment on it?

Mr. MARKUSSON. Mr. Chairman, speaking for the Manville operations, that standard was adopted internally as an operating standard and efforts were made to comply with that and where it could not be met because of industrial hygiene capabilities and equipment capabilities at the time, respirators were provided to employees within the Manville facilities, that is well documented.

Mr. FRANK. When was that adopted?

Mr. MARKUSSON. That was adopted as early as the mid-1930's out of a study that was sponsored by Manville and subsequently pub-

lished by the U.S. Public Health Service in 1935 and then those efforts continued on through the decades.

Mr. FRANK. And you think that was widespread throughout industry?

Mr. MARKUSSON. I can't really speak to widespread, Mr. Chairman. I certainly have heard testimony and seen documents suggesting that in numerous major manufacturers there were extensive efforts to comply with that 5 million particle standard.

I would also note that the medical and scientific literature certainly suggested as late as 1964 that the studies which had been done were indicating that exposures in many aspects of the work force were indeed below the 5 million particle standard. It is only recently that we have learned that the Navy and the Navy shipyards appear to be one notable exception to that.

Mr. FRANK. You said you have only recently learned that. I took from Mr. McKinney's assessment that people knew at the time the Navy was not complying with that standard throughout the period.

Mr. MARKUSSON. The Navy people knew. We have only recently discovered documents that were previously classified that gave us this information that they knew they were not complying and that they were creating a possibility of disease.

Mr. FRANK. The contractors working for the Navy didn't know that?

Mr. MARKUSSON. No. We found nothing to indicate that they knew of it. The Navy kept this as classified material.

Mr. FRANK. The Navy was using more asbestos in their ships. How were they violating it? Were they using more than they should have?

Mr. MARKUSSON. They were not following good work practices in handling the materials so that too much dust was created; people were not required to wear respirators.

Mr. FRANK. These were with their own naval employees, not contractor's employees?

Mr. MARKUSSON. Both.

Mr. FRANK. Wouldn't the contractors know that with regard to the contractor's employees?

Mr. MARKUSSON. I am not sure that the contractors had the right to go in and make dust counts. The work setting was under the control of the government.

Mr. FRANK. I understand. But where there was a contract, contractor, the contractor supplied the workers, it doesn't sound to me like anybody tried too hard to find out that they didn't know that people weren't wearing respirators and they knew people weren't with asbestos.

Mr. MARKUSSON. There is no indication that they knew that the standard, which was considered safe at that time, was being exceeded.

Mr. FRANK. The new people didn't know they were working with asbestos?

Mr. LONNQUIST. You are talking about a secure area. You are talking about shipyard work. The suppliers that you are referring to, the manufacturers who supplied these products weren't on the site.

Mr. FRANK. So you are talking about only naval employee workers, employees of the Navy Department?

Mr. LONNQUIST. Navy employees or Navy contract employees. We are talking about people who were working under the control of the Navy where they controlled the entire workplace and did the monitoring.

Mr. FRANK. You gave a percentage of what you think resulted from the Navy, was it 50 percent, what was it?

Mr. MCKINNEY. About half the lawsuits filed or from shipyard workers.

Mr. FRANK. You are saying the other 50 percent of the people were complying with the standard, but the standard wasn't good enough; is that your position?

Mr. MCKINNEY. Yes.

Mr. FRANK. And if the Navy only accounted for half of it, then we do have this other problem. You don't think there was a problem with compliance. You are saying the problem was with the standard?

Mr. MCKINNEY. It could have been both.

Mr. FRANK. That is what we are trying to get it.

Mr. MCKINNEY. You must understand that even under the heaviest exposures, many people do not get any disease.

Mr. FRANK. We understand that.

Mr. MCKINNEY. OK. So that if you have a degree of overexposure then that would include a certain number of people with greater susceptibility even though it excludes some people who aren't susceptible at all. It would be impossible to say what the numbers were if a place was characteristically 50 percent over the standard, how many additional disease cases the excess caused would be very difficult to say. But you know certainly there would be some.

Mr. FRANK. Then you don't know how much of the problem resulted from the standard being too high and how much from people not complying with the standard?

Mr. MARKUSSON. I believe there has been testimony before the committee this morning by Dr. Nicholson that even if the 5 million particle standard had been complied with throughout the country, Dr. Nicholson estimated, I believe——

Mr. FRANK. Fifty percent of the deaths.

Mr. MARKUSSON [continuing]. 175,000 fewer deaths. And nobody is suggesting that the 5-million-particle standard was correct. It was believed to be correct in 1938 when recommended by the U.S. Public Health Service and carried on through the years.

Mr. FRANK. But Dr. Nicholson also said, as did several other witnesses this morning, that there wasn't widespread compliance with that standard. That's why there will be twice as many deaths, he said, as there would have been if people had complied with that standard.

Mr. MARKUSSON. I can only suggest, Mr. Chairman, that certainly the efforts were made within Manville. And of the documents that I have seen recently the most widespread disregard for the standard that I have seen arises out of the U.S. Naval and Naval-controlled shipyard.

Mr. FRANK. It might be widespread but is that the only one? Mr. McKinney's statement said it was adopted and relied upon by both

Government and industry. Now you are saying it wasn't relied upon by Government.

Mr. McKINNEY. It was relied upon as being the standard but they didn't follow it.

Mr. FRANK. Mr. McKinney, that is a very strange use of the word adopted and relied upon. If you meant by adopted and relied upon—

Mr. McKINNEY. They recognized the standard as being an appropriate standard but they didn't follow it.

Mr. FRANK. Then I will repeat what I just said. That is a very strange use of the phrase "it was adopted and relied upon." I would think most people hearing you say or reading your statement that it was adopted and relied upon would expect that it was complied with.

If you meant to indicate that they thought it was a good standard but didn't pay any attention to it, I would suggest a different choice of words. I am focusing on your statement.

Mr. McKINNEY. If you read the attachments to the written statement, it is pretty clear that the medical people in the Government service, including the Navy, accepted that standard as being appropriate. And they were also aware that the groups that they were associated with were not following that standard because they wrote to the Surgeon General about it.

Mr. FRANK. Mr. McKinney, when you said—you did not say that the naval medical people adopted and relied upon it. The statement as you—

Mr. McKINNEY. I don't think anybody else in the Navy would have had the power to adopt a standard other than the medical people.

Mr. FRANK. You are telling me that the standard was adopted but nobody followed it?

Mr. McKINNEY. I won't quibble about the word "adopted."

Mr. FRANK. It is not a quibble. The question is whether or not a promulgation that is not binding is an effective way to regulate?

I believe in part, based upon what I have heard today and other discussions that I have had, was that in 1938 when the Public Health Service said this is the standard but did not make it a binding one, that that was not the proper way to go about it, leaving aside the fact that it was too high.

Your statement suggests the opposite, that the voluntary promulgation led to people adopting and relying on it. But I think that the evidence suggested, in fact—

Mr. McKINNEY. That statement wasn't intended to indicate that at all. It would have been much better if it had been a binding thing which had been enforced, but it wasn't.

Mr. FRANK. OK, I appreciate that.

Mr. MARKUSSON. Let me take one last try at this. The documents certainly indicate that during the war years and subsequent to the U.S. Public Health Service recommendation that the health officials within the Navy were endorsing the 5 million standard as an appropriate standard for use in naval yards. Subsequently, that did become incorporated in a U.S. Navy Bureau of Medicine instruction which I am advised has the effect of an order within the Navy controlling operation of a United States Naval shipyard.

That then continued in force at the 5-million-particle level until August of 1972.

Mr. FRANK. But as late as 1979 it wasn't being complied with, according to the statement? As late as 1979, you are saying that you couldn't have built a ship if you complied with it.

Mr. MARKUSSON. No, we are saying that you couldn't build a ship without the use of asbestos-containing materials. Certainly in the seventies the evidence is that compliance with appropriate occupational health standards became better in the Navy.

I wouldn't suggest that they were fully complying in 1979 or, indeed, in 1983. I just don't know.

Mr. FRANK. They used some asbestos but there was not a problem with exposure by 1979. At what point did the Navy begin to adopt that standard in a binding way for its own procedures?

Mr. MARKUSSON. I believe, Mr. Chairman, and I will be happy to provide the subcommittee with the first copy of the BuMed regulation I have, but I believe it was sometime in the late 1940's that it became adopted as a Bureau of Medicine regulation. There may have been one sooner than that.

Mr. FRANK. Were they from that time on fairly good about enforcing it themselves?

Mr. MARKUSSON. I think they were terrible.

Mr. FRANK. All right, that's my question. Was a point at which they became better at enforcing it than—

Mr. MARKUSSON. Certainly the evidence seems to indicate that by the mid-1970's they were getting appreciably better than they had been in previous years.

Mr. MCKINNEY. But by that time there was a new standard.

Mr. FRANK. The 1972 standard.

Now, what about the question of further reductions in the standards? Have you any views on that in terms of the time and—

Mr. MCKINNEY. We certainly think it is a matter which OSHA should address itself to and consider. There seems to be a general consensus that a 1-fiber-per-cc standard might be appropriate. There also is some indication—and that chart which you were shown here this morning was really addressed to this point—if you go below 1 fiber per cc, there are many people who doubt that you can accurately determine what the dust level is. And that was the point, I suppose, of why they showed you that chart.

Those are the various positions that have been taken for some time. We certainly think they ought to do the review and resolve these questions.

Let me just ask you. The point at which the Occupational Safety and Health statute was adopted and a binding standard was then promulgated, one that was legally binding, did that make a significant difference in anybody's behavior, either in the private or the public sector?

Mr. MCKINNEY. Prior to that the standard had been 5 fibers per cc. If you are going to comply with 2 fibers per cc, you obviously have to have equipment which is going to assure you that most of the time you are well below 2 fibers per cc.

So the change in the standard undoubtedly required considerably greater dust-control equipment than had been used prior to the reduction in ratio limit.

Mr. FRANK. Was there any difference in the pattern of compliance because one was legally binding and one was simply recommended, not for the Government itself, but for the private sector? Do you know if there was a difference in that pattern?

Mr. McKINNEY. Obviously, we can't speak for the whole industry because we don't know the whole industry. Within our company targets were set over the years which were lower than the recommended standards and we rather constantly had programs to develop dust-control equipment, and so on, to reduce the levels of dust.

That was all voluntary. We were not required to do that by economic forces or by Government regulation. It had largely to do with providing a comfortable workplace.

Mr. FRANK. Was there a problem for you? Or let me put it this way: Given a situation in which there is a standard which has been promulgated but not in a binding way, people have said not promulgated, but a standard has been declared and you are abiding by it, but some competitors are not. Are you better off if it then becomes a legal requirement that everybody abide by it?

Mr. McKINNEY. If we are talking specifically about asbestos, I don't think so. It turned out, having decided to provide a good working environment and as dust free as possible and having developed the ability to do that, it turned out that the cost of doing this was not great enough to be a significant competitive factor.

Mr. FRANK. Was that at either the 5 or the 2?

Mr. McKINNEY. Yes. It turned out that way, there were a lot of people who feared that going from 5 to 2 was going to have a tremendously adverse effect on the economics of the asbestos industry vis-a-vis other industries. That turned out not to be true.

Mr. FRANK. The cost of compliance was less than people thought?

Mr. McKINNEY. Yes.

Mr. FRANK. We have got a rollcall so I am going to recess for about 10 or 15 minutes.

Thank you, Mr. McKinney, no need for you to stay on. We will come back and hear from Ms. Seminario or Mr. Wodka.

[Recess taken.]

Mr. FRANK. We will reconvene and hear from Margaret Seminario from the department of occupational safety and health of the AFL-CIO.

STATEMENT OF MARGARET SEMINARIO, DEPARTMENT OF OCCUPATIONAL SAFETY AND HEALTH, AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATIONS

Ms. SEMINARIO. Good morning.

The AFL-CIO appreciates the opportunity to appear and testify before this subcommittee on the very important subject of the failure to regulate and control exposure to asbestos.

The occupational health disaster resulting from asbestos exposure which we are presently witnessing is of massive proportions.

An estimated 8,200 workers are now dying every year of asbestosis, lung cancers, and mesotheliomas resulting from past on-the-job exposures to asbestos.

An estimated 200,000 asbestos-related deaths will occur by the end of the century.

Lawsuits involving thousands of asbestos victims and millions of dollars have sent shock waves through the asbestos industry and their insurance carriers. Bankruptcy actions have been initiated by asbestos manufacturers to protect against future lawsuits. And compensation schemes proposed to provide retribution to the scores of thousands of unwitting asbestos victims.

The tragedy of asbestos is that the tragic destruction could have been prevented. Information showing the health hazards of asbestos known by the asbestos companies was withheld from the public. Steps were not taken to warn workers of the dangers or to control exposures. As a result, hundreds of thousands of workers will die.

Unfortunately, in 1983, the tragedy of asbestos continues. While the risks of asbestos are documented and well known, Federal Government regulations and enforcement policies still permit exposures potentially lethal to thousands of workers presently exposed.

Our written testimony has reviewed both the failure of the Government to establish and to enforce strong occupational asbestos regulations.

My oral testimony will focus primarily on the failure of the Occupational Safety and Health Administration under the Reagan administration to enforce the existing asbestos standard. And that testimony will follow on page 5 of my written statement.

Mr. FRANK. The whole statement will be placed in the record.

Ms. SEMINARIO. Thank you.

I am at the bottom of page 5.

The AFL-CIO is gravely concerned about the absence of serious enforcement of the asbestos regulations that are currently in place, indeed, the lack of enforcement of all regulations by the current administration. Even though OSHA has had evidence in hand for nearly 2 years, documenting the grave risk of exposure at the current permissible exposure levels, there has been absolutely no effort by the agency to step up enforcement of the current standard.

On the contrary, AFL-CIO analysis of OSHA enforcement data shows a 60-percent drop in citations for violations of the asbestos standard from fiscal year 1980 to 1982. This compares to a 27-percent drop in total citations for all standards over the same time period.

Rather than forcing reductions in asbestos exposure through the issuance of more serious, willful and repeat citations and larger penalties, OSHA has backed down in all these enforcement actions.

Serious citations for asbestos violations have dropped 68 percent, willful citations are down 98 percent, repeat citations are down 73 percent and penalties for violations of the asbestos standard have dropped by 85 percent.

The unions have reported difficulty in getting OSHA to conduct inspections to investigate potential asbestos exposure problems. A request by the Allied Industrial Workers that OSHA conduct inspections of demolition sites listed in documents transmitted to OSHA by EPA was turned down. OSHA responded that the EPA reports were not considered formal referrals and, therefore, did not trigger OSHA inspections.

At the Portsmouth Naval Shipyard, the unions filed several formal complaints with OSHA that the Navy was failing to provide

medical exams for asbestos-exposed workers as required by law. Instead of conducting a worksite inspection, OSHA forwarded the complaints to the Navy for handling. The Navy responded that there was no unsafe or unhealthful condition.

As this subcommittee knows, it took an all-out effort by the union, including Washington visits with OSHA and congressional representatives to get OSHA to schedule an inspection, and a hearing by this subcommittee to get the Navy to comply with the standard.

In our view, it should not take an act of Congress to obtain an OSHA inspection and insure employer compliance with the law.

There are also problems where OSHA does conduct inspections to investigate violations of the asbestos standard. According to OSHA's field operations manual, revised this April 1983, violations of the asbestos standard are to be cited as serious when the permissible exposure limit of 2 fibers is exceeded.

However, violations of other provisions of the standard such as medical surveillance and monitoring may be cited and grouped together as one other than serious violation, even though failure to comply with these aspects of the standard put workers at serious risk.

Penalties and citations are reduced in amount and gravity as part of an OSHA settlement policy. In one case where the employer was cited for violating monitoring, medical surveillance, respirator, labeling and housekeeping provisions of the standard, a meaningless penalty assessment of \$630 was reduced to just \$378 as part of an OSHA settlement agreement.

I might add, in this particular case the employer was also violating the general respirator standard, the lead standard, a standard on welding, in addition to other requirements. So this employer was grossly out of compliance with numerous OSHA standards, and also with the provisions of the asbestos standard itself.

In another case, serious and willful citations of the asbestos standard issued by the Carter administration in 1980 were settled in 1981 by the Reagan administration. The agreement reduced four willful citations to serious citations and decreased penalties from \$18,475 to just \$5,830. The agreement failed to specifically require close-out medical exams for exposed workers.

The employer is now refusing to provide the exams but there has been no follow-up inspection or other action by OSHA.

The AFL-CIO and the Industrial Union Department of AFL-CIO have expressed concern to OSHA about the lack and effective enforcement of the asbestos standard and recommended an aggressive enforcement policy which reflects the serious risk with asbestos exposure.

The failure of OSHA to enforce even the current inadequate asbestos standard calls into question the agency's true commitment to protect workers against the risks of exposure. Revisions of the current standard will be meaningless unless they are enforced. Workers will continue to die from asbestos-related diseases.

The AFL-CIO would like to see the following included in the asbestos enforcement program: An increased number of inspections of asbestos hazards, particularly in high risk demolition and removal jobs; a policy mandating serious citations for violations of the

standard regardless of exposure levels; greater use of willful citations where the employer has knowledge of the risks; and maximum penalties for violations of the standard.

In our view, in 1983 there is no excuse for employer noncompliance with the weak 1972 standard. Aggressive enforcement, not Government conciliation, is needed to protect workers from this deadly hazard.

It is our hope that with the encouragement of this committee, OSHA will respond to the current health risks posed by asbestos exposure and develop both strong regulations and an enforcement policy necessary to protect workers.

Thank you.

[Ms. Seminario's prepared statement follows:]

TESTIMONY OF MARGARET SEMINARIO,
DEPARTMENT OF OCCUPATIONAL SAFETY AND HEALTH,
AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATIONS
BEFORE THE HOUSE COMMITTEE ON GOVERNMENT OPERATIONS
SUBCOMMITTEE ON MANPCWER AND HOUSING ON
REGULATION OF OCCUPATIONAL EXPOSURE TO ASBESTOS

June 28, 1983

The AFL-CIO appreciates the opportunity to appear and testify before this subcommittee on the very important subject of the failure to regulate and control exposure to asbestos.

The occupational health disaster resulting from asbestos exposure which we are presently witnessing is of massive proportions. An estimated 8,200 workers are now dying every year of asbestosis, lung cancers and mesotheliomas resulting from past on-the-job exposures to asbestos. An estimated 200,000 asbestos-related deaths will occur by the end of the century. Law suits involving thousands of asbestos victims and millions of dollars have sent shock waves through the asbestos industry and their insurance carriers. Bankruptcy actions have been initiated by asbestos manufacturers to protect against future law suits. And compensation schemes proposed to provide retribution to the scores of thousands of unwitting asbestos victims.

The tragedy of asbestos is that the tragic destruction could have been prevented. Information showing the health hazards of asbestos known by the asbestos companies was withheld from the public. Steps were not taken to warn workers of the dangers or to control exposures. As a result, hundreds of thousands of workers will die.

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Unfortunately, in 1983 the tragedy of asbestos continues. While the risks of asbestos are documented and well known, federal government regulations and enforcement policies still permit exposures potentially lethal to thousands of workers presently exposed. Our testimony today will focus on the failure of government to establish and enforce strong occupational asbestos regulations.

The standards governing occupational exposure to asbestos in this country have never been adequate. Ever since the passage of the Occupational Safety and Health Act in 1970, meaningful government action to protect workers exposed to asbestos has been slow in coming, lagging behind known scientific evidence by five to ten years.

OSHA's first regulatory action on asbestos was an emergency temporary standard (ETS) issued in 1971 in response to a petition by the Industrial Union Department, AFL-CIO. The emergency standard which lowered the permissible exposure level to 5 fibers/cc was followed in 1972 by a permanent standard which incorporated the same exposure level (2 fibers/cc), but required the level be reduced to 2 fibers/cc in 1976. That standard remains in effect today.

The 2 fiber/cc OSHA asbestos standard promulgated in 1972 was based in large part upon a 1968 standard recommended by the British Occupational Hygiene Committee. The British standard, however, was established to protect against asbestosis. Scientific evidence showing lung cancer and mesothelioma resulting from asbestos exposure was not considered in the establishment of the

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British standard or OSHA regulation. Though evidence demonstrating the cancer risks posed by asbestos has been available since the 1960's, U.S. government regulations have never been designed to protect exposed workers from these diseases.

Since 1972, OSHA has initiated revision of its asbestos standard on several occasions. In 1975, in response to a court decision and new scientific evidence, OSHA proposed to lower the standard to 0.5 fibers/cc; except for the construction industry which was to be covered by a separate subsequent action. The proposed revision was published in the federal register and comments received but hearings on the proposal and final rulemaking action never occurred.

During the Carter Administration, OSHA's activities on asbestos centered on an evaluation and updating of the scientific evidence and the preparation of economic and technical feasibility documents required for rulemaking. A joint OSHA/NIOSH Asbestos Work Group was established, and in 1980 the group recommended a reduction of the permissible exposure limit to 0.1 fiber/cc, and improvements in the medical surveillance and environmental monitoring provisions of the standard. The report of the work group also stressed the need for reductions in the permissible exposures in the maritime and construction industries.

According to the last health standards status report prepared by the Carter Administration (January 1981) an advanced notice of a proposed standard for asbestos was scheduled for the 4th quarter of FY 1981. However, with the change in administration in 1981,

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the health standards priorities for OSHA changed dramatically. Scheduled improvements of inadequate standards such as asbestos were dropped or postponed; deregulatory actions for existing standards became priorities. In 1982, action on asbestos was postponed until the 3rd quarter FY 1982 for an advanced proposal, but there was no perceptible action indicating that OSHA was in fact working on revisions to the standard.

In 1982, the AFL-CIO became aware of a preliminary risk assessment for asbestos prepared by OSHA which reportedly showed very high levels of risk at current legal levels of exposures. AFL-CIO requests for a copy of the document were turned down. OSHA circulated the report to several parties for review, but failed to put it in the rulemaking docket for review and comment by the general public, even though the agency did so for other preliminary risk assessments such as benzene.

In February 1983, OSHA finally released the preliminary risk assessment to the public as part of the agency's filings to the U.S. Court of Appeals in the ethylene oxide case. The document estimated that at the current 2 fiber/cc standard as many as 8/1000-260/1000, or up to 25 percent of exposed workers may die from asbestos-related lung cancers. For total cancers, the risk was even greater. And even at reduced levels of exposure (0.5 fibers/cc and 0.1 fibers/cc) the assessment predicted a significant level of risk.

In March 1983, the AFL-CIO wrote the Assistant Secretary for OSHA criticizing the agency for withholding and failing to

- 5 -

act on evidence showing a grave danger, and requested expeditious regulatory action on asbestos.

In April, the Assistant Secretary informed the AFL-CIO that revisions of the asbestos standard was a top priority and set an expedited rulemaking schedule for a proposal in June 1983, and final action by the end of the year.

The AFL-CIO is encouraged by the Assistant Secretary's recent response on the asbestos standard, and from all indications the agency is now serious about revising the standard. However, there are several major areas of concerns.

OSHA has indicated its proposed revision will be based upon the earlier 1975 proposal which would limit permissible exposure to 0.5 fibers/cc. However, available scientific evidence supports the need for a stricter standard of 0.1 fibers/cc as recommended by the NIOSH/OSHA work group in 1980. OSHA's asbestos revisions will be separated into two rulemakings, one concerning the permissible exposure level, the other concerning provisions for medical surveillance, monitoring and other aspects of the standard. While a December 1983 final action has been set reducing the permissible exposure level, no date has yet been set for final action on the standard's other revisions which are equally important.

But of greatest concern to the AFL-CIO is the absence of serious enforcement of asbestos regulations, indeed all regulation by the current administration. Even though OSHA has had evidence in hand for nearly two years documenting the grave risk of exposure at the current permissible levels, there has been no effort by the agency to step up enforcement of the current standard.

- 6 -

On the contrary, AFL-CIO analysis of OSHA enforcement data shows a 60 percent drop in citations for violations of the asbestos standard from FY 1980 to FY 1982. This compares to a 27 percent drop in total citations for all standards over the same time period. Rather than forcing reductions in asbestos exposure through the issuance of more serious, willful and repeat citations, and larger penalties, OSHA has backed down in all these enforcement actions. Serious citations for asbestos violations have dropped 68%, willful citations are down 98%, repeat citations are down 73% and penalties have decreased by 85%. (See attached).

Unions report difficulty in getting OSHA to conduct inspections to investigate potential asbestos exposure problems. A request by the Allied Industrial Workers that OSHA conduct inspections of demolition sites listed in documents transmitted to the agency by EPA was turned down. OSHA responded that the EPA reports were not considered formal referrals, and therefore did not trigger OSHA inspections.

At the Portsmouth Naval Shipyard, the unions filed several formal complaints with OSHA that the Navy was failing to provide medical exams for asbestos-exposed workers as required by law. Instead of conducting a worksite inspection, OSHA forwarded the complaints to the Navy for handling. The Navy responded that there was no unsafe or unhealthful condition. As this subcommittee knows, it took an all out effort by the union, including Washington visits with OSHA and Congressional representatives to get OSHA to schedule an inspection, and a hearing by this subcommittee to get

- 7 -

the Navy to comply with the standard. In our view, it should not take an act of Congress to obtain an OSHA inspection and ensure employer compliance with the law.

There are also problems where OSHA does conduct inspections to investigate violations of the asbestos standard. According to OSHA's Field Operations Manual (April 1983) violations of the asbestos standard are to be cited as serious when the permissible exposure limit is exceeded. However, violations of other provisions of the standard such as medical surveillance and monitoring may be cited and grouped together as one other than serious violation, although failure to comply with these aspects of the standard put workers at serious risk.

Penalties and citations are reduced in amount and gravity as part of an OSHA settlement policy. In one case, (Robert E. Derecktor Co. #67321229) where the employer was cited for violating monitoring, medical surveillance, respirator, labeling and housekeeping provisions of the standard, a meaningless penalty assessment of \$630.00 was reduced to just \$378.00 as part of an OSHA settlement agreement. In another case, serious and willful citations of the asbestos standard issued by the Carter Administration were settled in 1981 by the Reagan Administration. The agreement failed to specifically require close-out medical exams for exposed workers. The employer is now refusing to provide the exams, but there has been no follow-up inspection or other action by OSHA.

The AFL-CIO and Industrial Union Department, AFL-CIO have expressed concern to OSHA about the lack of effective enforcement

- 8 -

of the asbestos standard and recommended an aggressive enforcement policy which reflects the serious risks of asbestos exposure. Failure of OSHA to enforce even the current inadequate asbestos standard calls into question the agency's commitment to protect workers against the risks of exposure. Revisions of the current standard will be meaningless unless they are enforced.

The AFL-CIO would like to see the following included in an asbestos enforcement program: 1) an increased number of inspections of asbestos hazards particularly in high risk demolition and removal jobs; 2) a policy mandating serious citations for violations of the standard regardless of exposure levels; 3) greater use of willful citations where the employer has knowledge of the risks; and 4) maximum penalties for violations of the standard. In our view, in 1983, there is no excuse for employer non-compliance with the weak 1972 standard. Aggressive enforcement, not government conciliation is needed to protect workers from this deadly hazard.

It is our hope that with the encouragement of this committee OSHA will respond to the current health risks posed by asbestos exposure and develop both strong regulations and an enforcement policy necessary to protect workers.

#

COMPLIANCE DATA
ASBESTOS STANDARD*
(1910.1001)

	Total Violations	Serious	Willful	Repeat	Other	Proposed Penalties	Contested Adjustment
FY 1980	1202	542	57	26	577	\$265,815	\$132,280
FY 1981	740	248	33	24	435	\$173,479	\$163,725
FY 1982	481	173	1	7	300	\$ 39,160	\$ 31,765
Percent Change FY 80-FY 82	-60%	-68%	-98%	-73%	-48%	-85%	-76%

*Compliance data for all standard's sections

Source: Reports on OSHA Standards Cited in Fiscal Year 1980, 1981 and 1982,
Occupational Safety and Health Administration,
Management Information System

Mr. FRANK. Thank you, Ms. Seminario.

Let me say we will have hearings scheduled at some point in the future focusing specifically on the lack of enforcement because I think that that is a very serious problem in this area as in some others.

Let me ask you about the reference you made with regard to the EPA and demolition sites. Demolition—several of the witnesses told us earlier—was a particularly serious potential cause of asbestos problems. Will you elaborate? You said that they said the list that they got from the EPA was not a formal referral so they could not, or would not—

Ms. SEMINARIO. Conduct inspections.

I have correspondence that is the subject of an exchange between the Allied Industrial Workers, which is headquartered in Milwaukee, and region 5 of OSHA which is located in Chicago, encompassing the Midwestern heavy industrial States including Illinois, Wisconsin, and that general region.

The correspondence was from a Mr. Milan Racic who is director of Health and Safety for the Allied Industrial Workers. Mr. Racic used to be an OSHA inspector. He used to work for the agency and when he was with OSHA he recured notices from EPA indicating that there were going to be demolitions at certain sites. He continued to get some of that information when he went to work for the Union and he requested of OSHA what was their policy with regards to this information.

One of the letters from Alan McMillan, who is the region 5 administrator, states, and let me just read it.

This is in response to your letter of April 18, 1983 regarding EPA demolition of worksites which contain asbestos. As this information is received from EPA, it is transmitted to the area office which has jurisdiction. Since these reports do not indicate any evidence of a violation of our asbestos standards they are not processed as referrals. Therefore, these reports are informational only and are maintained in the event that an inspection is scheduled at a facility during the time frame of demolition or renovation.

I should also note that OSHA has no jurisdiction over the general public and these or any areas that portion of your inquiry should be more appropriately addressed to the EPA. Sincerely, Alan McMillan.

So, according to OSHA, that information is not sufficient to trigger any kind of inspection. It is not considered informal complaint or information that would be used to schedule a general schedule inspection into those sites.

Mr. FRANK. Let me ask you first if there will be any objection to entering that correspondence into the record?

Ms. SEMINARIO. Not at all.

Mr. FRANK. If not, we will enter it into the record.

[The correspondence follows:]

DOMINICK D'AMBROSIO
INTERNATIONAL PRESIDENT
WILLIAM J. SALAMONE
INTERNATIONAL SEC. 1 - TREAS.

INTERNATIONAL UNION

Allied Industrial Workers
OF AMERICA
AFFILIATED WITH THE A.F.L.-C.I.O.



Telephone
414-645-9500

April 18, 1983

A I.W. BUILDING
3520 WEST OKLAHOMA AVENUE
MILWAUKEE, WISCONSIN 53215

Mr. Alan C. McMillan
Regional Administrator
U.S. Dept. of Labor
OSHA-32nd Floor
230 S. Dearborn Street
Chicago, Illinois 60604

Dear Mr. McMillan:

Enclosed is a list of demolition work sites that we received from the U.S.EPA. According to this document, these buildings did contain friable asbestos.

Please let me know what action did your office take to insure that workers at these work sites and the general public in the surrounding areas were not exposed to asbestos fibers.

Your prompt response is appreciated.

Sincerely,

Milan Racic
Milan Racic
Health and Safety Director

MR/ab
opeiu#9afl-cio

U.S. Department of Labor

Occupational Safety and Health Administration
230 South Dearborn Street
Chicago, Illinois 60604



May 24, 1983

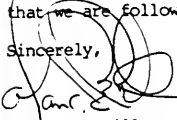
Mr. Milan Racic
Health and Safety Director
ALLIED INDUSTRIAL WORKERS OF AMERICA
AIW Building
3520 West Oklahoma Avenue
Milwaukee, WI 53215

Dear Mr. Racic:

This is in response to your recent letter which expanded upon your inquiry of April 18, 1983, regarding EPA's "Notification of Demolition (Friable Asbestos)." I responded to your original letter on May 5, 1983. That letter addressed the questions which are discussed in your recent correspondence.

Please note that our policy regarding this issue is discussed in our FOM and that we are following that guideline.

Sincerely,


Alan C. McMillan
Regional Administrator



DOMINICK D'AMBROSIO
INTERNATIONAL PRESIDENT
WILLIAM J. SALAMONE
INTERNATIONAL SECRETARY-TREAS.

INTERNATIONAL UNION:

Allied Industrial Workers
OF AMERICA
AFFILIATED WITH THE A.F.L.-C.I.O.



Telephone

414-645-9500

A. I. W. BUILDING
3520 WEST ORLANOWA AVENUE
MILWAUKEE, WISCONSIN 53215

May 17, 1983

Mr. Michael Connors
Deputy Regional Administrator
U.S. Dept. of Labor
OSHA-32nd Floor
230 S. Dearborn Street
Chicago, Illinois 60604

Dear Mr. Connors:

Enclosed is a copy of the latest U.S. EPA Region V "Notification of Demolition (Friable Asbestos)." Please let us know if your office is regularly receiving this information from the U.S. E.P.A. If your office is, we would like to know what is being done to prevent exposures to employees and the general public at these work locations? Please list your actions in the same order or provide information on the U.S. EPA forms in column designated "Results of inspections."

I hope that we do not have to discuss here the merits of trying to prevent unnecessary asbestos exposures. I think that OSHA should take action and try to assure that asbestos is either removed prior to the demolition or otherwise handled in a way consistent with OSHA's asbestos standard.

We believe that OSHA has an obligation to act since they are being informed that the demolition of buildings containing asbestos is taking place. Not acting on this information given to your agency at least as a referral requiring field investigations including air sampling, will not be consistent with OSHA's mandate under the act - to provide safe and healthful workplace.

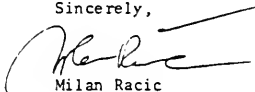
Michael Connors
May 17, 1983
Page 2

Please provide us with specific information requested above and also with an answer to our request for field inspections of all workplaces listed in this U.S. EPA notification and other similar information in the future.

At the same time would you please discuss this matter with your people in Washington, D.C. so that we are assured that this new inspection policy will cover all ten Regional Offices of OSHA.

Your prompt action and response is appreciated.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Milan Racic', with a long horizontal flourish extending to the right.

Milan Racic
Health and Safety Director

MR/ab
opeiu#9afl-cio

U.S. Department of Labor

Occupational Safety and Health Administration
230 South Dearborn Street
Chicago, Illinois 60604



May 5, 1983

Mr. Milan Racic
Health and Safety Director
ALLIED INDUSTRIAL WORKERS OF AMERICA
AIW Building
3520 West Oklahoma Avenue
Milwaukee, WI 53215

Dear Mr. Racic:

This is in response to your letter of April 18, 1983, regarding EPA demolition work sites which contain asbestos.

As this information is received from EPA, it is transmitted to the Area Office which has jurisdiction. Since these reports do not indicate any evidence of a violation of our asbestos standard, they are not processed as referrals. Therefore these reports are informational only and are maintained in the event that an inspection is scheduled at a facility during the time frame of the demolition or renovation.

I should also note that OSHA has no jurisdiction over the general public in these or any areas. That portion of your inquiry should be more appropriately addressed to the EPA.

Sincerely,

Alan C. McMillan
Regional Administrator



Mr. FRANK. What Mr. McMillan, is saying is that with regard to a list which EPA has referred to OSHA that the appropriate response would be to call that list to the attention of the EPA which sent it to OSHA in the first place.

Ms. SEMINARIO. They are saying for some aspects of it to call it to EPA's attention because EPA—

Mr. FRANK. At least someone at EPA must have been aware of that list since EPA compiled it. I am just wondering, OSHA's response didn't seem to be useful.

What would it take to get an inspection? I mean, they said they are not going to do it just because EPA referred it, suppose some of the people working there asked for one?

Ms. SEMINARIO. Under OSHA's current inspection policy the agency has somewhat limited its response to complaints or information of this kind.

There are four different kinds of OSHA inspections. They include general schedule inspections that the agency schedules both for safety hazards and health hazards. Also there are inspections in response to worker or union complaints. Complaints break down into two categories. Formal complaints are those that come in writing, are signed by a person who has some relationship with the employer such as an employee or employer representatives.

There is also another category of complaints called nonformal complaints which come in over the telephone or come in perhaps in writing but are from a member of the general public. OSHA doesn't consider them to be a formal complaint. OSHA divides those two kinds of complaints with respect to how it responds. It will only respond under its policy with an actual workplace inspection to a formal complaint.

A nonformal complaint will simply be answered by a letter from OSHA to the employer saying that OSHA has information available, that someone has complained about a situation and ask is it true? isn't it true? and if it is true, what are you doing to correct it?

In our view, the agency is really missing the boat because a lot of those informal complaints may contain serious hazards.

So in this case it doesn't even look like OSHA is considering this EPA transmittal to be even sufficient to institute a nonformal complaint.

Mr. FRANK. Did that union represent any of the people involved in any of these demolition sites?

Ms. SEMINARIO. Not in these particular sites that I know of.

Mr. FRANK. But in the case of the Portsmouth-Kittery Naval Base even a request by employees and their legal representatives didn't automatically trigger an inspection; is that correct?

Ms. SEMINARIO. That is correct. If you read OSHA's enforcement policy, their bible of enforcement, which is a field operations manual, that kind of non-response is contrary to the policy. However, as we talk to our union representatives around the country, what we find is that the area offices are not necessarily following the policy as stated from the national office.

In other words, formal written complaints are coming into OSHA from workers, and they are coming into OSHA from union representatives, and they are not being responded to by inspections.

They are simply being responded to by letters to the employer. This is a problem and I don't see any action by the national office to correct this kind of problem.

Mr. FRANK. Let me ask, and I will conclude with this. If you will continue to compile them, sometime later this summer or later this fall we will have a hearing specifically addressing the enforcement policy, not just with regard to asbestos but across the board, because it obviously ties into the questions of budget adequacy as well as other issues.

Thank you very much, Ms. Seminario. Can we get a copy of those documents? Do you have an extra copy?

Ms. SEMINARIO. I do. And there are also just a couple of other documents I would like to enter dealing with some of my testimony: One is a settlement agreement in which OSHA reduced these citations and penalties; another is a citation in which, in our view, there were inadequate assessments for penalties as well as overly long abatement periods for asbestos-related hazards. Those are the three documents I would like to leave with you.

Mr. FRANK. Thank you. Those will be entered into the record and we will also before the record closes, write to OSHA and if they have any response and explanation they would like to make we will hold the record open for that.

Ms. SEMINARIO. Thank you.

Mr. FRANK. We will give OSHA a chance to respond.

Thank you.

[The documents follow:]

UNITED STATES OF AMERICA

OCCUPATIONAL SAFETY AND HEALTH REVIEW COMMISSION

JUL 13 1980

SECRETARY OF LABOR, United States
Department of Labor,

Complainant,

v.

THOMAS O'CONNOR & CO., INC.,

Respondent.

DOCKET NO. 80-4586

REGION I

SETTLEMENT AGREEMENT

Complainant and Respondent hereby stipulate and agree that:

(1) On July 17, 1980, respondent was cited for alleged violations of the Occupational Safety and Health Act of 1970, 29 USC 651, et seq., hereinafter referred to as the Act and was issued a Notification of Proposed Penalty in the total amount of \$18,475.

(2) Respondent, an employer within the meaning of Section 3(5) of the Act, duly filed with a representative of the Secretary of Labor a notice of intent to contest the citations and proposed penalties. This notice was duly transmitted to the Review Commission and it is agreed that jurisdiction of this proceeding is conferred upon said Commission by Section 10(c) of the Act.

(3) The Secretary of Labor has filed a complaint herein stating with particularity the violations alleged, the penalty proposed and the issues in contest before the Commission.

(4) As a result of consideration by Complainant of new information bearing upon the factors set forth in sections 17(j) and 9(a) of the Act, the Complainant hereby moves to amend his complaint as follows: (a) Citation No. 2 - Change all four (4) Willful items to Serious; (b) Change penalties on the four (4) Willful items to \$1000 each; (c) All other penalties and designations remain the same; Total Amended Penalty - \$5830.

(5) Respondent agrees to distribute a written safety procedure to all management and supervisory personnel regarding all OSHA regulations concerned with the handling, mixing, application, removing, cutting, scoring, etc., of asbestos and byproducts of asbestos.

(6) In view of the aforesaid, respondent hereby withdraws its Notice of Contest and the parties agree that the citation and proposed penalty, as amended by this agreement, shall be affirmed and become the final Order of the Occupational Safety and Health Review Commission.

(7) Respondent certifies that the violations alleged have been abated or will be abated by the abatement dates as shown in the citation as amended above, and that the penalty, as amended, has been paid. Respondent agrees to comply with the Act in all respects in the future.

(8) Respondent further certifies that the original Notice of Contest and a copy of this agreement have been posted and that all pleadings and documents in this matter have been served in accordance with Commission Rules 7 and 100.

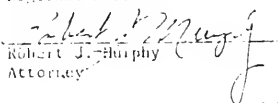
(9) Respondent's consent to the entry of a final order by the Commission pursuant to this settlement agreement shall not constitute an admission by Respondent of violations of the Act in any proceedings other than proceedings brought directly under the provisions of the Occupational Safety and Health Act of 1970 including, but not limited to, any citations issued or penalties proposed by the Secretary under the provisions of sections 10(a) and 10(b) of the Act.

THOMAS O'CONNOR & CO., INC.

BY 

T. Timothy Ryan, Jr.
Solicitor of Labor

Albert H. Ross
Regional Solicitor


Robert J. Murphy
Attorney

United States Department of Labor
Attorneys for Complainant

U. S. Department of Labor

Occupational Safety and Health Administration

169 Weybosset St., 5th floor
Providence, RI 029033893

Reply to the Attention of

February 3, 1983

James Lennon, Business Agent
United Steel Workers of America
Local #9057
980 Reservoir Avenue
Cranston, RI 02910

Dear Mr. Lennon:

RE: Robert E. Derecktor of Rhode Island, Inc.

Enclosed please find a copy of the Settlement Agreement reached with
the above referenced company on 1/31/83. Also enclosed is a copy
of the citations with changes noted.

Sincerely,

A handwritten signature in cursive script, appearing to read "L. Anku".

LINDA R. ANKU
Area Director

Encl.

 FEB 3 10 38 AM '83
 RECEIVED
 OSHA
 REGIONAL OFFICE
 PROVIDENCE

U. S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

In the Matter of: Robert E. Derecktor of
Rhode Island, Inc.

OSHA No. G7321-229

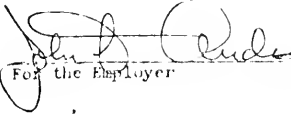
Informal Settlement Agreement

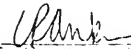
The undersigned Employer and the undersigned Occupational Safety and Health Administration (OSHA) in settlement of the above citation(s) and penalties which were issued on January 7, 1983, hereby agree as follows:

1. The Employer agrees to abate the violations as cited in the above referenced citations or as amended below.
2. The Employer agrees to pay the proposed penalties, if any, as issued with the above referenced citation(s) or, if amended by this agreement, as amended below.
3. The Employer and OSHA agree that the following citations and penalties (if any) are not being amended by this agreement. NONE
4. OSHA agrees that the following citations and penalties are being amended as follows: SEE ATTACHED

5. The employer, by signing this informal settlement agreement, hereby waives its rights to contest the above citation(s) and penalties, as amended in paragraph 4 of this agreement.

6. The employer agrees to immediately post a copy of this Settlement Agreement in a prominent place at or near the location of the violation(s) referred to in paragraphs 3 and 4 above. This Settlement Agreement must remain posted until the violations have been corrected or for 3 working days (excluding weekends and Federal Holidays), whichever period is longer.


For the Employer


For the Occupational Safety
and Health Administration

11/31/83
Date

NOTICE TO EMPLOYEES

The law gives you or your representative the opportunity to object to any abatement date set for a violation if you believe the date to be unreasonable. Any contest to the abatement dates of the citations amended in paragraph 4 of this Settlement Agreement must be mailed to:

U. S. Department of Labor - OSHA
169 Weybosset Street, 5th Floor
Providence, RI 02903

This must be done within 15 working days (excluding weekends and Federal Holidays) of the receipt by the Employer of this Settlement Agreement. You or your representative also have the right to object to any of the abatement dates set for violations referred to in paragraph 3, provided that the objection is mailed to the office shown above within the 15 working day period established by the original citation.

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Keyboaset St., 5th floor
Providence, RI 029033833

ISSUANCE DATE 1/7/83	OSHA NUMBER 67321 229
REGION 01	PAGE 1 OF 10

OTHER	2
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INSPECTION DATE:
9/3-12/14/82

INSPECTION SITE:
Bldg. 6

TO Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a prominent
place at or near the location of the violation.

The violations described in this citation are alleged to have occurred on or about the day the inspection was made unless otherwise indicated within the description given below.

The issuance of this citation does not constitute a finding that a violation of the Act has occurred unless there is a failure to contest as provided for in the Act or, if contested, unless the citation is affirmed by the Review Commission.

1
29 CFR 1910.107(c)(2): Open flame(s) or spark producing equipment, not separated by a partition, were located within 20 feet of spraying area(s):

Repair Yard, Temporary Pipe Shop: Welding equipment was located in the spraying area on or about 10/26/82.

2
29 CFR 1910.107(c)(8): Portable lamp(s) were used in spraying area(s) during spraying operations:

Repair Yard, Temporary Pipe Shop: A non-explosion-proof portable lamp was used to illuminate parts being sprayed on or about 10/26/82.

3
29 CFR 1910.111(b)(10)(ii): Stationary ammonia storage installation(s) did not have at least two suitable gas masks in readily accessible location(s):

Building 10: No respiratory protective devices were available on or about 9/30/82.

4
29 CFR 1910.111(b)(10)(iii): Stationary storage installations did not have an easily accessible shower or a 50-gallon drum of water.

Building 13: No shower or water for flushing of the body was available on or about 9/30/82.

5
29 CFR 1910.132(a): Protection equipment was not used when

AREA DIRECTOR

LINDA H. AMCO

page

NOTICE TO EMPLOYEES - The law gives an employee or his family the right to sue an employer if the employer discriminates against an employee for filing a complaint or for testifying in a proceeding. EMPLOYER DISCRIMINATION UNLAWFUL - The law prohibits an employer from discriminating against an employee for filing a complaint or for testifying in a proceeding. TOTAL FEES FOR THIS CITATION

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033093

ISSUANCE DATE	OSHA NUMBER	
1/7/83	07321	229
REGION	AREA	PAGE
01	0190	2 OF 10

OTHER	2
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INSPECTION DATE
8/3-12/14/82INSPECTION SITE
Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 13, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-

Violations No.

ITEM NUMBER STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED: DESCRIPTION RECORD NUMBER

necessary whenever hazards capable of causing injury and impairment were encountered:

New Subassembly Building: (1) Chipfitter guiding rigged stool plate was not wearing safety shoes on or about 10/13/82.

the alleged violations below have been grouped because they involve similar or related hazards that may increase the potential for injury resulting from an accident.

SA
29 CFR 1910.134(a)(2): The employer did not establish and maintain a respiratory protection program which included the requirement outlined in paragraph (b) of this section:

New Subassembly Building: Two (2) employees were exposed to iron oxide fumes in excess of the 8-hour time weighted average of 10 mg/m³ during confined space MIG welding operations in Hanger butt 4&5 on or about 10/13/82.

SB
29 CFR 1910.1000(a)(2): Employee(s) were exposed to material(s) in excess of the 8-hour time weighted average limit(s) listed for the particular material(s) in table Z-1 of Subpart Z of 29 CFR part 1910:

New Subassembly Building: Two (2) employees performing confined space MIG welding were exposed to iron oxide fumes in excess of the 8 hour time weighted average limit of 10 mg/m³ on or about 10/13/82.

SC
29 CFR 1910.253(f)(4)(i): Adequate ventilation to prevent accumulation of toxic materials or possible oxygen deficiency was not provided for welders or helpers engaged in welding and cutting operations or other personnel in the immediate vicinity in confined spaces:

New Subassembly Building: Two (2) employees overexposed to iron oxide fumes from confined space MIG welding were not provided with adequate ventilation on or about 10/13/82.

4/4/83

2/7/83

2/7/83

78
243

AREA DIRECTOR

LINDA R. ARKU

NOTICE TO EMPLOYEES - The law gives an employee or his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro- TOTAL 12

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033993

ESTABLISHMENT 1/7/83	OSHA NUMBER 07321 229
REGION 01	PAGE 3 OF 10

OTHER	2
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INSPECTION DATE
9/3-12/14/82INSPECTION SITE
Bldg. 6

10. Robert E. Doroschick of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-

2 - Before Post

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED: DESCRIPTION

- 6D
29 CFR 1910.134(b)(1): Written standard operating procedures governing the selection and use of respirators were not established:

New Subassembly Building: Two (2) employees overexposed to iron oxide fumes while MIG welding in confined spaces and written SOP's were not established for respirator selection and use.

4/4/83

- 6E
29 CFR 1910.134(b)(2): Respirator(s) were not selected on the basis of hazards to which the worker was exposed:

New Subassembly Building: Employee, overexposed to iron oxide fumes during confined space MIG welding in Master butt 445 was wearing a respirator with organic vapor cartridges preceded by dust and mist filters on or about 10/13/82.

2/7/83

- 6F
29 CFR 1910.134(b)(3): The users of respirators were not instructed and trained in the proper use of respirators and their limitations:

New Subassembly Building: Employee, overexposed to iron oxide fumes during confined space MIG welding on Master butt 445 wearing a respirator with organic vapor cartridges preceded by dust and mist filters on or about 10/13/82 was not trained in the proper use and limitations of respirators.

4/4/83

- 6G
29 CFR 1910.134(b)(5): Respirators were not regularly cleaned and disinfected. Respirators issued for the exclusive use of one worker were not cleaned after each day's use, or more often if necessary. Respirators used by more than one worker were not cleaned and disinfected after each use:

New Subassembly Building: Employee, overexposed to iron oxide fumes during confined space MIG welding on or about 10/13/82, was wearing a respirator that was not cleaned after each day's use. The one supplied air face mask was stored in a tool chest.

4/4/83

AREA DIRECTOR

LINDA R. AMICI

NO COPY

NOTICE TO EMPLOYEES - The law gives an employee or his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro- TOTAL PER

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U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033833

ISSUANCE DATE 1/7/83		OSHA NUMBER G7321 229	
REGION 01	AREA 0190	PAGE 4	OF 10

TYPE OF VIOLATIONS - SECTION 102	
OTHER	2

INSPECTION DATE 9/3-12/14/82

INSPECTION SITE Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-
nent place at or near the location of the vio-

STANDARD: RESPIRATORY PROTECTION (29 CFR 1910.134(b)(6)): Respirators were not stored in a convenient, clean and sanitary location:

New Subassembly Building: Employee, overexposed to iron oxide fumes during confined space MIG welding on Master butt 445 did not store respirator in a clean location on or about 10/13/82.

29 CFR 1910.134(b)(8): Appropriate surveillance of work area conditions and degree of employee exposure or stress was not maintained:

New Subassembly Building: The employer did not evaluate work conditions and degree of employee exposure to assure that employees were provided with respiratory protection appropriate for protection against the amount and type of air contaminants to which they were exposed:

i) Employees were exposed to iron oxide fumes as well as other metal fumes and gases and no surveillance was performed.

29 CFR 1910.134(b)(10): Persons were assigned to tasks requiring use of respirators and it had not been determined that they were physically able to perform the work and use the equipment, and the respirator user's medical status was not reviewed periodically (for instance annually):

New Subassembly Building: Employee, overexposed to iron oxide fumes, wearing a respirator prior to a determination that the employee was physically able to perform the work while wearing the respirator on or about 10/13/82.

4/4/83

4/4/83

4/4/83

AREA DIRECTOR

LINDA R. ATKU

NOTICE TO EMPLOYEES - The law gives an employee or his representative the opportunity to object to any abatement date. EMPLOYER DISCRIMINATION UNLAWFUL - The law prohibits discrimination by an employer against an employee for exercising these rights. TOTAL PENALTY \$0.00

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033393

ISSUANCE DATE 1/7/83	OSHA NUMBER 07321 229
REGION 01	PAGE 5 of 10

OTHER	2
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INSPECTION DATE:
9/3-12/14/82INSPECTION SITE
Bldg. 6

TO: Robert E. Dereckter of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-
nent place at or near the location of the vio-

CPR 1910.134(e)(2): Individual(s) issuing respirators were not adequately instructed to insure that the correct respirator was used:

New Subassembly Building: Tool crib attendants were not adequately instructed to insure that the correct respirator was used on or about 10/13/82.

2/7/83

CPR 1910.134(e)(5): Both supervisor(s) and worker(s) were not instructed in the proper selection, use and maintenance of respirators by a competent person(s). Training did not provide the individuals with the opportunity to handle the respirator, have it fitted properly, put it face-piece-to-face seal, wear it in normal air for a long familiarity period, and finally wear it in a test atmosphere:

New Subassembly Building: Employees overexposed to iron oxide fumes in confined space MIG welding and supervisors as well as workers were not trained on or about 10/13/82.

3/7/83

CPR 1910.134(e)(5)(i): Every respirator wearer did not receive fitting instructions including demonstrations and practice in how the respirator should be worn, how to adjust it, and how to determine if it fits properly. Respirators were worn when conditions such as growth of beard, sideburns, a skull cap that projected under the face piece, or temple pieces on glasses, prevented a good face seal. The face piece fit was not checked by the wearer to assure proper protection every time he put on the respirator:

New Subassembly Building: Employee overexposed to iron oxide fumes wearing a respirator and a full beard did not receive any fitting instructions on or about 10/13/82.

4/4/83

CPR 1910.252(e)(2)(1)(a): Helper(s) or attendant(s) in arc welding or cutting operation(s) were not provided with proper eye protection:

a) New Subassembly Building: Helper not wearing eye protection working on four foot extension of Hyster truck on 9/30/82.

Immediately

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AREA DIRECTOR

LINDA R. ARKU

NOTICE TO EMPLOYEES - The law gives an employee or his representative the opportunity to object to any abatement date. EMPLOYER DISCRIMINATION UNLAWFUL - The law prohibits discrimination by an employer against an employee for

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U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY
169 Weybosset St., 5th floor
Providence, RI 029033393

ISSUED 1/17/83	CITATION NUMBER 07321 229
REGION 01	PAGE 6 OF 10

TYPE OF VIOLATION OR CITATION	
OWNER	2

INSPECTION DATE
1/12/82

INSPECTION SITE
DIA

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02340

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-
nent place at or near the location of the vio-

b) New Subassembly Building: Helper not wearing eye
protection working on 906/6 on 10/13/82.

The alleged violations below have been grouped because they involve
similar or related hazards that may increase the potential for injury
resulting from an accident.

OSHA 1910.1025(1)(1)(i): Employee(s) working in an area where
there is potential exposure to airborne lead at any level were not
informed of the content of Appendices A and B of this regulation:

- Repair Yard: Employees throughout yard exposed to
lead were not informed of the contents of Appendices A & B
of 1910.1025.
- New Subassembly Building: Employees performing confined
space welding were not informed of the contents of Appendices
A & B of 1910.1025.

OSHA 1910.1025(1)(1)(ii): A training program was not instituted
as required for all employees who were subject to lead exposure
at or above the action level, or for whom the possibility of skin or
eye irritation existed:

Employees listed below were exposed to lead in excess of
the action level and were not trained as delineated in
paragraph (v) of this section:

- Drydock #2- Firefighter: Welder inside sanitary tank
on or about 9/24/82.
- Pier #1- YU: Waysman burning painted steel in forward
cargo hold on or about 9/24/82.
- Drydock #2- Firefighter: Pipefitter burning coated
steel in forward bilge on or about 10/6/82.

AREA DIRECTOR

LINDA R. ANKU

NOTICE TO EMPLOYEES - The law gives an employee or his
representative the opportunity to object to any abatement date. EMPLOYER DISCRIMINATION UNLAWFUL - The law pro-
hibits discrimination by an employer against an employee for
TOTAL P
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U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033093

ISSUANCE DATE 1/7/83		OSHA NUMBER 07321 229	
REGION 01	AREA 0190	PAGE 7	OF 0

TYPE OF VIOLATION (See Manual)	
OTHER	2

INSPECTION DATE:
9/3-12/14/82

INSPECTION SITE
Bldg. 6

TO Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 13, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a prominent place.

Notice Period

ITEM NUMBER STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED: DESCRIPTION

d) Drydock #2- Two abrasive blasters/tenders removing paint from valves removed from the Firefighter on or about 9/24/82.

e) Drydock #2- Firefighter: Forward bilge-welder serving as a fire watch on or about 10/6/82.

f) Pier #1- Ferry "Greenport": Shipfitter tack welding on painted surfaces on or about 10/26/82.

2/7/83

29 CFR 1910.1025(1)(2)(i): A copy of 29 CFR 1910.1025 and its appendices was not made readily available to all employees who had a potential exposure to airborne lead at any level:

a) Repair Yard: Employees throughout the yard exposed to lead did not have a copy of this standard and its appendices made readily available to them.

b) New Subassembly building: Employees performing confined space welding did not have a copy of this standard and its appendices made readily available to them.

4/4/83

29 CFR 1910.1025(m)(2)(i): Warning signs bearing the legend: "WARNING, LEAD WORK AREA, POISON, NO SMOKING OR EATING" were not posted in each work area where the permissible exposure limit (PEL) was exceeded:

Employees listed below were exposed to lead in excess of the PEL and no signs were posted in the areas:

a) Drydock #2- Firefighter: Welder inside sanitary tank on or about 9/24/82.

b) Pier #1-YO: Hayman burning painted steel in forward cargo hold on or about 9/24/82.

c) Drydock #2- Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82.

AREA DIRECTOR

LINDA R. ARZU

VOICE TO EMPLOYEES - The law gives an employee on his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro TOTAL

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033993

ISSUANCE DATE 1/7/83	OSHA NUMBER 67321 229	
REGION 01	AREA 0190	PAGE 8 of 0

OTHER	2
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INSPECTION DATE
9/5-12/14/82INSPECTION SITE
Bldg. 6

TO: Robert E. Derocktor of Rhode Island, Inc.
and its successors
Bldg. 19, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a prominent place.

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED

d) Drydock #2: Two abrasive blasters/tenders removing paint from valves removed from the Firefighter on or about 9/24/82.

2/7/83

36
285

by CFR 1915.34(c)(1)(iv): Deadman control device(s) were not provided at the nozzle(s) end of blasting hose(s) to provide direct cutoff or to signal the pot tender by means of a visual and audible signal to cut off the flow:

a) Drydock #1- Three abrasive blast nozzles with no deadman control on or about 10/5 and 10/6/82.

b) Drydock #2- Two abrasive blast nozzles with no deadman control on or about 9/24/82.

The alleged violations below have been grouped because they involve similar or related hazards that may increase the potential for injury resulting from an accident.

10A

by CFR 1915.34(c)(3)(iii): Employee(s), other than blaster(s), including machine tender(s) and abrasive recovery employee(s) working in area(s) where unsafe concentration(s) of abrasive material(s) and dust(s) were present, were not protected by eye and respiratory protective equipment in accordance with the requirements of 1915.151(a) and (b) and 1915.152(a) and (d):

Immediately

48
285

Drydock #1: (i) Abrasive blast tender exposed to total nuisance dust in excess of the 8-hour time weighted average limit of 15 mg/M was wearing an unapproved dust mask on or about 10/5/82.

(ii) Employee tending abrasive blaster was not wearing safety glasses with side shields or goggles on or about 10/5/82.

Immediately

10B

by CFR 1910.1000(c): Employee(s) were exposed to material(s) in excess of the 8-hour time weighted average limit(s) listed for that material(s) in table Z-3 of subpart Z of 29 CFR part 1910:

AREA DIRECTOR

LINDA R. ANDRU

NOTICE TO EMPLOYEES - The law gives an employee or his/her representative the right to file a complaint with the OSHA area office if he/she believes that the employer has violated the law. EMPLOYER DISCRIMINATION UNLAWFUL - The law prohibits an employer from discriminating against an employee for filing a complaint with OSHA or for testifying in a proceeding. TOTAL FEES \$0.00

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 02903393

ISSUANCE DATE 1/7/83	OSHA NUMBER G7321 229
REGION C1	PAGE 9 OF 10

OTHER	2
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INSPECTION DATE
9/3-12/14/82INSPECTION SITE
Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 13, Coddington Cove
Middletown, RI 02840

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7-00 ATTENTION
Before Post.

ITEM NUMBER STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED.	DESCRIPTION	RECORDED	
	Drydock #1: Employee tending abrasive blaster was overexposed to total nuisance dusts during paint removal operations from barge "Massachusetts" on or about 10/5/82.	4/4/83	0
	CPR 1915.35(b)(7): Light(s) that were not explosion proof, approved by the Underwriters Laboratories for use in Class 1, Group 2 atmospheres, or approved as permissible by the Mine Safety and Health Administration or the U.S. Coast Guard, were used in areas where paint(s) and tank coatings were dissolved in highly flammable, toxic and flammable solvents.		
	Drydock 1: Portable waterproof lights were used to illuminate painting operation on or about 10/6/82.	2/7/83	0
	CPR 1915.35(b)(9): The face, eyes, head, hands and all other exposed parts of the bodies of the employee(s) handling highly flammable paint(s) were not protected.		
	Drydock #1: Employee painting the underside of barge "Massachusetts" had his goggles atop his head on or about 10/6/82.		
	CPR 1915.72(a)(1): Ladder(s) with such defects as broken or missing rung(s) or step(s) broken or split side rail(s) or other faulty or defective construction were not immediately withdrawn from service when such defect(s) were discovered.	1/17/83	0
	Repair Yard- Drydock #1- North access to wing walls. Lower rungs of ladder were unevenly spaced.		
	CPR 1915.73(b) Manhole(s) or other comparable small opening(s) on the deck or other working surfaces were not suitably covered and guarded.	Immediately	0
	Drydock #1- Barge "Massachusetts": Port manhole of ballast tank #3 was open and not guarded on or about 10/5/82.		

AREA DIRECTOR

LINDA R. ANGEL

Page 10
TOTAL

EMPLOYER DISCRIMINATION UNDER THE LAW

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033893

ISSUANCE DATE 1/7/83			OHA NUMBER 07321 229		
REGION 01	AREA 0150	PAGE 10 OF 10			

OTHER	
	2

INSPECTION DATE
9/3-12/14/82INSPECTION SITE
Bldg. 8

TO: Robert E. Dereaktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a prom-
inent place at or near the location of the vio-

5
CPR 1915.73(c): The edges of large openings were not guarded in
the working area to a height of 36 to 42 inches:

Firefighter Maindeck: Unguarded opening in pilot house
exposing employees to a fall hazard on or about 10/6/82.

6
CPR 1915.74(a)(4): The gangway was not kept properly trimmed at
all times:

Pier #1- Ferry "Greenport": Gangway to vessel was not trimmed.

7
CPR 1915.97(b): The employer did not obtain all applicable
item(s) of information necessary to ascertain the potential fire,
toxic or reactivity hazard(s) likely to be encountered in the handling,
application, or utilization of hazardous materials:

Yardwide: The company did not have material safety data
sheets on file with all the information required for the
hazardous materials used in the yard including but not
limited to paints, abrasive materials, and filler metals
and their coatings.

8
CPR 1915.98(a): At least one employee, close at hand, was not
qualified to administer first aid to the injured:

Repair Yard: No one on second shift was trained to
administer first aid on or about 10/6/82.

Immediately 0

Immediately 0

3/7/83 69
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Immediately 0

AREA DIRECTOR

LEIDA R. ALEX

NOTICE TO EMPLOYEES - The law gives an employee or his representative the opportunity to object to any abatement date. EMPLOYER DISCRIMINATION UNLAWFUL - The law pro-
hibits discrimination by an employer against an employee for

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U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033393

ISSUANCE DATE 1/7/83		OSHA NUMBER 77321 229	
REGION 01	AREA 0190	PAGE 1	OF 17

TYPE OF VIOLATION / CITATION NO.	
SERIOUS	1

INSPECTION DATE:
9/3-12/14/82
INSPECTION SITE:
Bldg. 6

TO: Robert E. Dorektor of Rhode Island, Inc.
and its successors
Bldg. 13, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of

Be kept on file
Before
of

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED; DESCRIPTION	BE CORRECTED
<p>The violations described in this citation are alleged to have occurred on or about the day the inspection was made unless otherwise indicated within the description given below.</p> <p>The issuance of this citation does not constitute a finding that a violation of the Act has occurred unless there is a failure to contest as provided for in the Act or, if contested, unless the citation is affirmed by the Review Commission.</p> <p>The alleged violations below have been grouped because they involve similar or related hazards that may increase the potential for injury resulting from an accident.</p> <p>1A 29 CFR 1910.20(a)(5): Scaffolds were moved horizontally while they were occupied:</p> <p>Bldg. 40: Helper moved two stage scaffold while oxyacetylene torch operator was on it, on or about 10/13/82.</p> <p>13 29 CFR 1910.29(a)(3)(vii): All work levels 10 feet or higher above ground or floor did not have a standard guard rail:</p> <p>a) Building 40: Employee cutting pipes from a two stage mobile scaffold without fall protection on or about 10/13/82.</p> <p>b) Building 40: Employee welding atop three stage mobile scaffold without fall protection, on or about 10/13/82.</p> <p>2A 29 CFR 1910.95(a): Protection against the effects of noise was not provided for employee(s) exposed to sound levels which exceeded those listed in Table G-16 of Subpart G of 29 CFR 1910:</p> <p>The employees listed below were overexposed to noise and hearing protection was not worn.</p> <p>a) Building 234: Employee grinding small parts in South end of building on or about 9/30/82.</p> <p>b) New Subassembly Building: Employee grinding and reedling on Module 5 on or about 10/13/82.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>

" AREA DIRECTOR

LINDA R. AGCU

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NOTICE TO EMPLOYEES - The law gives an employer or his EMPLOYER DISCRIMINATION UNLAWFUL - The law gives an employer or his

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033393

ISSUANCE DATE 1/7/83	OSHA NUMBER G7321 229	
REGION 01	AREA 0190	PAGE 2 of 17

TYPE OF VIOLATION/SECTION OF STATUTE	
SERIOUS	1

INSPECTION DATE
9/3-12/14/82INSPECTION SITE
Bldg. 6

TO Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

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Citation be posted immediately in a promi-
nent place at or near the location of the vio-

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STANDARD, REGULATORY SECTION OF THE ACT

c) Dry Dock #2: Two employees tending abrasive blasters
on or about 10/13/82.

d) New Subassembly Building: Employee grinding and reaming
in confined spaces of Master Butt 425 on or about 10/13/82.

2B

29 CFR 1910.95(c): The employer did not administer a continuing
effective hearing conservation program as described in paragraphs
(c) through (e), whenever employees were exposed to noise in excess
of 85 dBA for an 8 hour time weighted average:

The company had no hearing conservation program.

3/7/83

2C

29 CFR 1910.95(e)(1): When information indicated that employees'
noise exposures may equal or exceed an 8 hour time weighted average
of 85 dBA, the employer did not obtain measurements for those
employees:

Employees performing numerous production & repair operations
throughout the facility were exposed to noise in excess of
85 dBA and no noise measurements were taken by the company
to determine exposure levels. (When measuring the employees'
noise exposures, all continuous intermittent and impulsive
sound levels from 80-130 dBA shall be integrated into
the computation.)

3/7/83

2D

29 CFR 1910.95(L)(3): Employees excessively exposed to noise were
not given the opportunity to select their hearing protectors from
a variety of suitable hearing protectors provided by the employer:

Yardwide: Only one type of hearing protector was available.

2/7/83

AREA DIRECTOR

LINDA R. ARDU

NOTICE TO EMPLOYEES - The law gives an employee or his
representative the right to be heard at any time before any
adverse action is taken against an employee.

EMPLOYER DISCRIMINATION UNLAWFUL - The law pro-
hibits discrimination by an employer against an employee for
exercising his or her rights under the law.

TOTAL
FOR

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033893

ISSUANCE DATE 1/7/83		OSHA NUMBER G7321-229	
REGION 01	AREA 0190	PAGE 3 of 17	

SERIES OF VIOLATIONS	
SERIOUS	1

INSPECTION DATE
9/3-12/14/82

INSPECTION SITE
Bldg. 6

TO: Robert E. Dorecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a prominent place at or near the location of the violation.

25
29 CFR 1910.95(1)(4): Employees excessively exposed to noise were not trained in the use and care of all hearing protectors provided to them:

Yardwide: No training was received in the proper insertion techniques for the ear plugs provided.

26
29 CFR 1910.95(n)(1): The employer did not institute a training program for all employees who are exposed to noise at or above a time weighted average of 85 dBA.

Yardwide: No training program was established for employees exposed to noise in excess of 85 dBA TWA.

27
29 CFR 1910.95(o)(1): The employer did not make available to the affected employees or their representatives copies of this standard and did not post a copy in the workplace.

Yardwide: No copy of the noise standard was made available to employees or their representatives.

28
29 CFR 1910.252(a)(2)(v)(b)(4): Cylinders which were not secured on a special truck did not have valve-protection caps put in place before the cylinders were moved.

Repair Yard: Two uncapped acetylene cylinders were transported unsecured in a front end loader, on or about 10/26/82.

The alleged violations below have been grouped because they involve similar or related hazards that may increase the potential for injury resulting from an accident.

29
29 CFR 1910.424(c)(2): Diver was not line tended from the surface or accompanied by another diver in the water in continuous visual contact during SCUBA diving operation:

AREA DIRECTOR

LINDA R. AREY

NOTICE TO EMPLOYEES - The law gives an employee the right to file a complaint with the OSHA area director if he or she believes that the employer is violating the law. The law also prohibits an employer from discriminating against an employee for filing a complaint with the OSHA area director.

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U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033993

ISSUANCE DATE 1/7/83	OSHA NUMBER 07321 229
REGION 01	AREA 0190
	PAGE 4 of 17

TYPE OF VIOLATION (CITATION NO.)	
SERIOUS	1

INSPECTION DATE
9/3-12/14/82INSPECTION SITE
Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-
nent place at or near the location of the violation.

Dry Dock #1: During diving operations on 10/1/82, the diver was neither line tended nor accompanied by another diver.

4B
29 CFR 1910.424(c)(1): SCUBA diving was conducted without a standby diver available while a diver was in the water:

Dry Dock #1: No standby driver was available during a six and one-half hour dive on 10/1/82.

Abatement Note: The standard requires a standby diver for all operations. He shall be available at the dive location equipped and ready to go to the assistance of the diver in the water. A buddy-diver in the water does not satisfy the requirement of a standby diver. A tender can be the standby diver if the diver is line-tended and visible from the surface, and the person-in-charge can be the standby diver, but the working interval of the dive must end if he is required to enter the water since there would no longer be a designated person-in-charge remaining at the dive location.

2/7/83

4C
29 CFR 1910.410(c)(1): No person was designated as "person-in-charge" at the dive location:

Dry Dock #1: No person was designated as "person-in-charge" during diving operations on 10/1/82.

Abatement Note: The designated "person-in-charge" shall be:

1. at the dive location
2. in charge of all aspects of the diving operation
3. responsible for the safety and health of dive team members.
4. experienced and trained in the conduct of the assigned diving operation.
5. experienced and trained in the use of tools, equipment, systems, techniques, and emergency procedures which pertain to the assigned tasks and diving mode utilized. (i.e. SCUBA)

2/7/83

AREA DIRECTOR

LINDA R. ANKU

Sup 1-10
Pa 33

NOTICE TO EMPLOYEES - The law gives an employee or his representative the opportunity to object to any abatement date. EMPLOYER DISCRIMINATION UNLAWFUL - The law prohibits discrimination by an employer against an employee for TOTAL P. FOR 1

TOTAL P
1.00

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033893

ISSUANCE DATE 1/7/83	OSHA NUMBER C7321 229
REGION 01	PAGE 6 of 17

TYPE OF VIOLATION (CITATION NO.)	
SERIOUS	1

INSPECTION DATE
9/3-12/14/02INSPECTION SITE
Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 13, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-

Before Post

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED. DESCRIPTION

Implementing the requirements of this standard. For each diving mode engaged in, the safe practices manual shall include: (i) Safety procedures and checklists for diving operations;
(ii) Assignments and responsibilities of the dive team members;
(iii) Equipment procedures and checklists; and
(iv) Emergency procedures for fire, equipment failure, adverse environmental conditions, and medical illness and injury.

411

2) CFR 1910.421(b): A list of emergency first aid phone numbers was not kept at the dive location:

Repair Yard: phone numbers listed did not include available physicians and the nearest U.S. Coast Guard Rescue Coordination Center.

Abatement Note: A list shall be kept at the dive location of the telephone or call numbers of the following:

- (i) An operational decompression chamber (if not at the dive location);
- (ii) Accessible hospitals;
- (iii) Available physicians;
- (iv) Available means of transportation; and
- (v) The nearest U.S. Coast Guard Rescue Coordination Center.

Immediately

411

3) CFR 1910.421(c)(3): An American Red Cross standard first aid handbook or equivalent and a bag-type manual resuscitator with transparent mask and tubing were not available at the dive location:

Dry Dock #1: The required first aid supplies were not available at the dive location.

2/7/83

411

4) CFR 1910.423(d)(1)(v): The approximate underwater and surface conditions (visibility, water temperature and current) were not recorded and maintained for each diving operation:

Dry Dock #1: No records of visibility and temperature were maintained.

Immediately

AREA DIRECTOR

LTHDA R. ANKU

See Inc.

NOTICE TO EMPLOYEES - The law gives an employee or his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro

TOTAL

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033893

ISSUANCE DATE 1/7/83	FORM NUMBER G7321 229
REGION 01	PAGE 7 of 17

VIOLATION TYPE SERIOUS	1
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INSPECTION DATE
9/3-12/14/82INSPECTION SITE
Bldg. 6

TO: Robert E. Dorecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-

ITEM NUMBER STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED DESCRIPTION

42
29 CFR 1910.423(d)(1)(v): The maximum depth and bottom time for each diver were not recorded and maintained for each diving operation:

Dry Dock #1: No maximum depths and bottom times were recorded for each diver.

5A
29 CFR 1915.7(a)(1): One or more competent person(s) were not designated by the employer:

Repair Yard: No competent person was designated.

Abatement Note: 1915.7(a)(2) requires that the employer must indicate in U.S. Department of Labor Form OSHA 73 "Designation of Competent Person" those employees designated as competent persons and forward the executed form to the nearest area office of the Occupational Safety and Health Administration.

5B
29 CFR 1915.14(b): In dry cargo holds for which a Marine Chemist certificate is not required, hot work was performed before a competent person had carefully examined the hold and found it to be free of flammable liquids, gases and vapors:

Pier #1-YO: Burning in bow cargo hold was performed without a competent person examination on or about 9/24/82.

5C
29 CFR 1915.14(c): Hot work was performed in engine or boiler room space(s) of vessel(s) for which a Marine Chemist certificate was not required, or in engine compartment(s) of boat(s), before the bilges were inspected and tested by a competent person to ensure that they were free of flammable liquids, gases, and vapors:

a) Pier #1, YO: Grinding was performed in the engine room without prior testing or inspection by a competent person on or about 9/24/82.

Immediately

3/7/83

3/7/83

3/7/83

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AREA DIRECTOR

LINDA R. ARKU

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NOTICE TO EMPLOYEES - The law gives an employee or his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro-

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U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 02903393

ISSUANCE DATE 1/7/83	OSHA NUMBER G7321 229
REGION 01	PAGE 8 of 17

TYPE OF VIOLATION	
SERIOUS	1

INSPECTION DATE:
9/3-12/14/82
INSPECTION SITE
Bldg. 6

TO: Robert E. Darektoer of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02040

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Citation be posted immediately in a promi-

to be posted

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED: DESCRIPTION

b) Dry Dock #2, Firefighter: Grinding and welding was performed in the engine room without prior testing or inspection by a competent person on or about 10/26/82.

3/7/83

29 CFR 1915.35(b)(8): A competent person did not inspect all power and lighting cable(s) to ensure that the insulation was in excellent condition, free of cracks and worn spots, that there were no connections within fifty feet of the operation, that lines were not overloaded, and that they were suspended with sufficient slack to prevent undue stress or chafing in areas where paint and tank coatings were dissolved in highly volatile, toxic and flammable solvents.

Dry Dock #1: No competent person inspected the lighting cables prior to painting. Connections were at times within ten feet of the operation on or about 10/6/82.

3/7/83

29 CFR 1915.53(b): Tests were not conducted by a competent person to determine the flammability of preservative coatings, the flammability of which was not known before welding, cutting or heating was commenced on any surface covered by such coatings.

Dry Dock #2, Firefighter: Employee in bilge was cutting on coated steel without prior testing by a competent person on or about 10/6/82.

5/30/83

29 CFR 1910.1001(f)(1): Initial monitoring was not conducted in such a manner to determine whether every employee's exposure to airborne asbestos fibers is below the prescribed limits.

Environmental monitoring was not conducted in the locations below to determine proper respiratory protection and special clothing requirements:

- a) Shipbuilding Area: Building 40- On or about 10/13/82.
- b) Pier #1, for "Greenport"- Engine room on or about 10/26/82.

LA DIRECTOR

LEONA R. ANDER

NOTICE TO EMPLOYEES - The law gives an employee or his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro TOTAL

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033893

ISSUANCE DATE 1/7/83	OSHA NUMBER G7321 229
REGION 01	PAGE 9 of 17

TYPE OF VIOLATION	CITATION NO.
SERIOUS	1

INSPECTION DATE
9/3-12/14/82INSPECTION SITE
Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 13, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-

Before V

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED: DESCRIPTION

Explanatory Footnote: The employer is required to determine the exposure of each of his employees to airborne asbestos each day he removes asbestos-containing insulation.

6B

29 CFR 1910.1001(c)(2)(1.1): Employees engaged in the spraying of asbestos, the removal or demolition of pipes, structures, or equipment covered or insulated with asbestos, or the removal or demolition of asbestos insulation or coverings were not provided with respiratory equipment in accordance with paragraph (d) (2) (1.1) of this section and special clothing in accordance with paragraph (d) (3) of this section:

a) Bldg. 40- Shipbuilding Area: Two employees were removing asbestos-clad pipes wearing only negative pressure respirators and full body disposable coveralls and gloves on or about 10/13/82.

b) Pier #1- Perry "Greenport"- Engine Room: Three employees removing machinery and valves from pipes covered with asbestos insulation were not wearing any respiratory equipment or special clothing on or about 10/26/82.

Explanatory Footnote: The employer is required to provide supplied air respirators until he has determined the exposure levels of his employees to asbestos during demolition or removal operations are less than 100 times the limits in 1910.1001(b).

6C

29 CFR 1910.1001(d)(2)(iv)(a): The employer did not establish a respirator program in accordance with American National Standards "Practices for Respirator Protection", ANSI Z38.2-1969:

Employees listed below were exposed to asbestos fibers and a respirator program was not established in accordance with the above:

a) Shipbuilding Area, Bldg. 40: Two employees observed removing asbestos clad pipes on or about 10/13/82.

AREA DIRECTOR

LINDA R. ANKU

NOTE TO EMPLOYEES - The law gives an employee or his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro- TOTAL

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033893

ISSUANCE DATE 1/7/83	OSHA NUMBER 07321 229
REGION 01	PAGE 10 of 17

TYPE OF VIOLATION OR DEFENSE	
SERIOUS	1

INSPECTION DATE
9/3-12/14/82

INSPECTION SITE
Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

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Before
1/1/83

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED: DESCRIPTION

b) Pier #1, Ferry "Greenport": Engine room; three employees observed removing machinery and valves on or about 10/26/82.

2/7/83

6D

29 CFR 1910.1001(j)(2): The employer did not provide or make available, to each employee, within 30 days following his first employment in an occupation exposed to airborne levels of asbestos fibers, a comprehensive medical examination:

Employees listed below were engaged in the demolition or removal of asbestos and were not given medical examinations:

a) Bldg. 40 Shipbuilding Area: Two employees observed removing asbestos clad pipes on or about 10/13/82.

b) Pier #1 Ferry "Greenport"- Engine Room: Three employees observed removing machinery and valves from piping covered with asbestos on or about 10/26/82.

5/30/83

6E

29 CFR 1910.1001(g)(1)(i): Caution signs were not provided and displayed in such a manner so that employees could read them and take necessary protective steps before entering an area where airborne concentrations of asbestos fibers may be in excess of prescribed limits:

Entrances to the following areas were not posted in any way:

a) Shipbuilding Area: Bldg. 40: On or about 10/13/82.

b) Pier #1: Ferry "Greenport", engine room: on or about 10/26/82.

1/24/83

6F

29 CFR 1910.1001(g)(2)(1): Caution labels were not affixed to all raw materials, mixtures, scrap, waste, debris, or other products containing asbestos fibers, or to their containers, which during any reasonably foreseeable use, handling, storage, disposal, processing or transportation could release airborne concentrations of asbestos fibers exceeding prescribed exposure limits:

AREA DIRECTOR

LINDA R. ANNU

DATE
1/24/83

NOTICE TO EMPLOYEES - The law gives an employee or his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro TOTAL PT

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033893

ISSUANCE 1/17/83	RECEIVED C7321, 229
REGION 01	PAGE 11 of 17

SERIOUS	1
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INSPECTION DATE
9/3-12/14/82INSPECTION SITE
Bldg. 8

TO: Robert E. Derocktor of Rhode Island, Inc.
and its successors
Bldg. 13, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-
nent place at or near the location of the vio-
lation cited herein. The Citation must

Piles of asbestos scrap at the following locations were
not labeled:

- a) Dry Dock #2, Atop South wing wall: bags of asbestos
scrap and loose asbestos on or about 9/22/82.
- b) End of Pier #1: Broken bags of asbestos scrap on or
about 9/24/82 and 9/30/82.
- c) Shipbuilding Area, North of Bldg. 40: Asbestos scrap
pile on or about 10/13/82.
- d) Pier #1, at gangway from ferry "Greenport": Sealed
bags of asbestos scrap on or about 10/26/82.

6C

29 CFR 1910.1001(h)(2): Asbestos waste, scrap, debris, bags, con-
tainers, equipment, and asbestos-contaminated clothing, consigned for
disposal, which may produce airborne levels of asbestos fibers in
excess of prescribed limits was not collected and disposed of in
sealed impermeable bags or other closed, impermeable containers:

Immediately

Asbestos waste and scrap was not collected in sealed
impermeable bags or other closed containers in the following
areas:

- a) Dry Dock #2, Atop wing wall: Loose asbestos on or about
9/22/82.
- b) End of Pier #1: Broken bags of asbestos scrap on or
about 9/24/82 and 9/30/82.
- c) Shipbuilding Area, North of Building 40: Asbestos
scrap pile on or about 10/13/82.

1A

29 CFR 1910.1025(o)(1): Employee(s) were exposed to lead at concen-
trations greater than fifty micrograms per cubic meter of air
averaged over an eight-hour period:

- a) Drydock #2- Firefighter: Welder inside sanitary tank
on or about 9/24/82.

2/7/83

AREA DIRECTOR

LINDA R. ANZU

NOTICE TO EMPLOYEES - The law gives an employee or his representative the opportunity to object to any abatement date
EMPLOYER DISCRIMINATION UNLAWFUL - The law pro-
hibits discrimination by an employer against an employee for

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U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 02903393

ISSUANCE DATE 1/7/83	OSHA NUMBER 07321 229
REGION 01	PAGE 12 of 17

REASON FOR CITATION	
SERIOUS	1

INSPECTION DATE
9/3-12/14/82

INSPECTION SITE
Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 19, Coddington Cove
Middletown, RI 02340

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a promi-

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED

b) Pier #1- YO- Wayman burning painted steel in forward cargo hold on or about 9/24/82.

c) Drydock #2- Firefighter: Pipefitter burning coated steel on forward bilge on or about 10/6/82.

7B

29 CFR 1910.1025(f)(1): Respirators required under this section for protection against lead, were not used:

The employees listed below were exposed to lead in excess of the permissible exposure level (PEL) and were not wearing respirators:

a) Drydock #2- Firefighter: Welder inside sanitary tank on or about 9/24/82.

b) Pier #1- YO- Wayman burning painted steel in forward cargo hold on or about 9/24/82.

7C

29 CFR 1910.1025(f)(2)(iii): Respirators were not selected from those approved for protection against lead dust, fume, and mist by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part II:

a) Drydock #2- Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82 was wearing a respirator with organic vapor cartridges which did not afford protection against fumes.

7D

29 CFR 1910.1025(f)(3)(i): The employer did not assure that the respirator(s) issued to employee(s) for protection against lead exhibited minimum facepiece leakage and were fitted properly:

a) Drydock #2- Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82 was wearing a negative pressure respirator and was not instructed in how to perform positive and/or negative pressure fit tests to assure a tight facepiece to face seal.

" AREA DIRECTOR

LINDA R. ANCU

NOTICE TO EMPLOYEES - The law gives an employee or his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro-

TOTAL

CITATION and NOTIFICATION OF PENALTY

169 Noybasset St., 5th floor
Providence, RI 029033993

ISSUANCE DATE 1/7/83	CITATION NUMBER G7321 229
REGION 01	PAGE 13 of 17

TYPE OF VIOLATION(S) - 1	
SERIOUS	1

INSPECTION DATE: 9/3-12/14/82

INSPECTION SITE: Bldg. 8

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this Citation be posted immediately in a prominent place at or near the location of the violation(s) cited below. The Citation must

73

29 CFR 1910.1025(f)(3)(ii): Quantitative or qualitative face fit tests were not provided at the time of initial fitting and at least semi-annually thereafter for each employee wearing negative pressure respirators for protection against lead:

- a) Drydock #2- Firefighter: pipefitter, burning coated steel in forward bilge on or about 10/6/82, wearing a negative pressure respirator overexposed to lead, was not fit tested.

Explanatory Footnote: Qualitative fit tests shall be conducted in accordance with Appendix D of 1910.1025.

74

29 CFR 1910.1025(f)(4)(i): A respiratory protection program for employees exposed to lead was not instituted in accordance with 29 CFR 1910.134(b), (d), (e), and (f):

Repair Yard: Respirators were used for protection against lead without a program for selection, use, cleaning, storage and maintenance of respirators.

75

29 CFR 1915.53(d)(1): Surfaces covered with toxic preservative(s) in an enclosed space(s) were not stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application nor were employees protected by airline respirators meeting the requirements of 1915.152(a):

Employees listed below did not strip back all lead containing coatings for a distance of at least 4 inches from the area of heat application nor did they wear airline respirators:

- a) Drydock #2- Firefighter: Welder inside sanitary tank on or about 9/24/82.
b) Pier #1- YO: Weyman burning painted steel in forward cargo hold on or about 9/24/82.
c) Drydock #2- Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82.

AREA DIRECTOR

LENN R. ANKU

11/14/82

NOTICE TO EMPLOYEES - The law gives an employee or his representative the opportunity to object to any abatement date. EMPLOYER DISCRIMINATION UNLAWFUL - The law prohibits discrimination by an employer against an employee for filing a complaint or for exercising any rights under this Act. TOTAL PENALTY FOR CITATION: \$1,000

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 02903393

ISSUANCE DATE 1/7/83		OSHA NUMBER G7321 229	
REGION 01	AREA 0190	PAGE 14	OF 17

TYPE OF VIOLATION	
SERIOUS	1

INSPECTION DATE
9/3-12/14/82

INSPECTION SITE
Bldg. 6

THE LAW REQUIRES that a copy of the
Citation be posted immediately in a prom

to: Robert E. Derektor of Rhole Island, Inc.
and its successors
Bldg. 13, Coddington Cove
Middletown, RI 02840

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED

3
29 CFR 1910.1025(d)(2): An initial determination was not made to determine if any employee may be exposed to lead at or above the action level:

Repair Yard: Initial determinations were not made during the following operations:

- a) Welding on painted or coated surfaces
- b) Burning on painted or coated surfaces
- c) Abrasive blasting on painted or coated surfaces
- d) Grinding on painted or coated surfaces.

The alleged violations below have been grouped because they involve similar or related hazards that may increase the potential for injury resulting from an accident.

9A
29 CFR 1910.1025(e)(3)(ii)(v): The employer whose employees were exposed to lead in air concentrations in excess of the permissible exposure limit did not have adequate written work practice program for items required under sections (g)(h) & (i) of 29 CFR 1910.1025:

- a) Repair Yard: Employees were exposed to excessive air lead concentrations and the company did not have written policies and procedures for the issuance and care of protective work clothing, housekeeping and personal hygiene practices.

9B
29 CFR 1910.1025(g)(1): Appropriate protective work clothing and equipment were not provided (at no cost to the employee) and its use assured when employees were exposed to lead above the permissible exposure limit:

The employees listed below were overexposed to lead and were not provided with and required to wear coveralls or full body protective work clothing, hats, and shoes or disposable shoe coverlets:

- a) Dry Dock #2- Firefighter: Welder inside sanitary tank on or about 9/24/82.

" AREA DIRECTOR

LEONA R. ARDU

NOTICE TO EMPLOYEES - The law gives an employee or his representative the opportunity to object to any abatement data... EMPLOYER DISCRIMINATION UNLAWFUL - The law pro... TOTAL

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033893

ISSUANCE 1/7/83	FILE NUMBER O7321 229
REGION 01	AREA 0190
PAGE 15	OF 17

TYPE OF VIOLATION (See Section 1701)	
SERIOUS	1

INSPECTION DATE
9/3-12/14/82INSPECTION SITE:
Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

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STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED:

b) Pier #1-YO: Wayman burning painted steel in forward cargo hold on or about 9/24/82.

c) Drydock #2- Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82.

5/9/83

29 CFR 1910.1025(1)(2)(ii): Change rooms were not equipped with separate storage facilities for protective work clothing and equipment and for street clothes to prevent cross contamination from lead:

Employees listed below were overexposed to lead and the locker room did not have separate storage facilities:

a) Drydock #2- Firefighter: Welder inside sanitary tank on or about 9/24/82.

b) Pier #1-YO: Wayman burning painted steel in forward cargo hold on or about 9/24/82.

c) Drydock #2- Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82.

d) Drydock #2- Two abrasive blasters/tenders removing paint from the valves removed from Firefighter on or about 9/24/82.

5/9/83

29 CFR 1910.1025(1)(3)(ii): Shower facilities, in accordance with 29 CFR 1910.141(a)(3), were not provided for employee(s) exposed to lead in excess of the permissible exposure limit (PEL), without regard to the use of respirators:

Showers were not available for employees overexposed to lead as listed below:

a) Drydock #2- Firefighter: Welder inside sanitary tank on or about 9/24/82.

b) Pier #1-YO: Wayman burning painted steel in forward cargo hold on or about 9/24/82.

AREA DIRECTOR

LINDA R. ALGU

NOTICE TO EMPLOYEES - The law gives an employee or his EMPLOYER DISCRIMINATION UNLAWFUL - The law pro

TOTAL FOR

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 02903393

ISSUANCE DATE 1/7/83	CASE NUMBER C7321 229
REGION 01	PAGE 16 of 17

SERIOUS	1
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INSPECTION DATE
9/3-12/14/82INSPECTION SITE
Bldg. 6

TO: Robert E. Derecktor of Rhode Island, Inc.
and its successors
Bldg. 18, Coddington Cove
Middletown, RI 02840

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Citation be posted immediately in a promi-
nent location of the firm.

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED

c) Drydock #2- Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82.

d) Drydock #2- Two abrasive blasters/tenders removing paint from the valves removed from the Firefighter on or about 9/24/82.

CPR 1910.1025(1)(4)(111): Employee(s) exposed to lead in excess of the permissible exposure limit (PLL), without regard to the use of respirators, were not required to wash their hands and face prior to eating, drinking, smoking or applying cosmetics:

Employees listed below were overexposed to lead and were not required to wash their hands and faces prior to eating, drinking or smoking.

a) Drydock #2- Firefighter: Welder inside sanitary tank on or about 9/24/82.

b) Pier #1- YU: Waysman burning painted metal in forward cargo hold on or about 9/24/82.

c) Drydock #2- Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82.

d) Drydock #2- Two abrasive blasters/tenders removing paint from the valves removed from the Firefighter on or about 9/24/82.

CPR 1910.1025(1)(4)(iv): Employees entering luncheon facilities with protective work clothing or equipment were not required to remove surface lead dust by vacuuming, downdraft booth, or other cleaning method(s):

Employees listed below were overexposed to lead and employer did not provide means so that employees could remove surface lead contamination before eating:

a) Drydock #2- Firefighter: Welder inside sanitary tank on or about 9/24/82.

AREA DIRECTOR

LINDA R. ANKU

NOTICE TO EMPLOYEES - The law gives an employee or his/her representative the right to be heard before any employer action is taken which may result in a change in status or a discharge. The law also prohibits discrimination against an employee for exercising these rights. The law prohibits an employer from discriminating against an employee for exercising these rights. The law prohibits an employer from discriminating against an employee for exercising these rights.

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

CITATION and NOTIFICATION OF PENALTY

169 Weybosset St., 5th floor
Providence, RI 029033993

ISSUANCE DATE 1/7/83	OSHA NUMBER G7321 229
REGION 01	PAGE 17 of 17

TYPE OF VIOLATION (See 1910.1025)	1
SEVERITY	1

INSPECTION DATE:
9/3-12/14/82

INSPECTION SITE:
Bldg. 6

TO: Robert E. Deracktor of Rhode Island, Inc.
and its successors
Bldg. 13, Coddington Cove
Middletown, RI 02840

THE LAW REQUIRES that a copy of this
Citation be posted immediately in a prominent place.

STANDARD, REGULATION OR SECTION OF THE ACT VIOLATED: DESCRIPTION

- b) Pier #1- YO: Waysman burning painted steel in forward cargo hold on or about 9/24/82.
- c) Drydock #2 Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82.
- d) Drydock #2- Abrasive blasters/tenders removing paint from valves removed from the Firefighter on or about 9/24/82.

10

29 CFR 1910.1025(j)(1)(i): A medical surveillance program was not instituted for all employee(s) who were, or could be exposed to lead above the action level for more than thirty (30) days per year:

Employees listed below were exposed to lead in excess of the action level and the company did not institute a medical surveillance program:

- a) Drydock #2- Firefighter: Welder inside sanitary tank on or about 9/24/82.
- b) Pier #1-YO: Waysman burning painted steel in forward cargo hold on or about 9/24/82.
- c) Drydock #2- Firefighter: Pipefitter burning coated steel in forward bilge on or about 10/6/82.
- d) Drydock #2- Two abrasive blasters/tenders removing paint from valves removed from the Firefighter on or about 9/24/82.
- e) Drydock #2-Firefighter: Forward bilge-welder serving as a fire watch on or about 10/6/82.
- f) Pier #1- Ferry "Greenport"-- Shipfitter tack welding on painted surfaces on or about 10/26/82.

2/7/83

6432
5725

AREA DIRECTOR

LEIDA R. ALIX

3670
5725

NOTICE TO EMPLOYEES -- The law gives an employee or his/her representative the right to be heard before any action is taken against an employee for discharge or discipline. The law also gives an employee or his/her representative the right to be heard before any action is taken against an employee for discharge or discipline. The law also gives an employee or his/her representative the right to be heard before any action is taken against an employee for discharge or discipline.

TOTAL P
5725

Mr. FRANK. Our final witness is Steven Wodka from Frederick M. Baron & Associates.

STATEMENT OF STEVEN WODKA, DIRECTOR OF HEALTH EFFECTS RESEARCH, FREDERICK M. BARON & ASSOCIATES

Mr. WODKA. Thank you, Mr. Chairman.

I will try and summarize my 14-year obsession with asbestos in 10 minutes or less.

I began following this mineral in 1969 when I was an international representative with the oil, chemical and atomic workers assigned to the health and safety department.

In 1981, I became employed by Frederick M. Baron & Associates which is a plaintiffs law firm representing about 700 asbestos claimants throughout the United States.

OSHA's asbestos standard was a total disaster from the day it was published in the Federal Register in June 1972. The standard established a permissible exposure limit of 2 fibers greater than 5 microns in length per cubic centimeter.

The protection that the standard seems to provide is deceptive. Two fibers per cubic centimeter is the exact equivalent of 2 million fibers per cubic meter. The average working man inhales from 4 to 8 cubic meters of air during an 8-hour workday. Therefore, the real permissible dose under the standard is 8 million to 16 million inhaled asbestos fibers per working day. Even in 1972, OSHA's hearing record was replete with medical evidence that such a high daily dose of asbestos fibers would induce cancer.

Since then the medical community has developed models for predicting the cancer risks due to asbestos at varying exposure limits. Ironically, it was OSHA's own staff that compiled this data into a "preliminary risk assessment for asbestos" on August 12, 1981. This document was withheld from the public until recently.

It is fairly apparent why the agency tried to keep this study from the public view. The risk assessment revealed that continued occupational exposure to asbestos at the current legal limit of 2 million fibers per cubic meter of air would result in a range of 18,400 to 598,000 excess lung cancer deaths based on an exposed population of 2.3 million workers. These shocking figures were in addition to the 200,000 excess cancer deaths that the Mount Sinai School of Medicine has estimated will occur over the next 20 years due to the legacy of asbestos exposure from World War II to 1972.

The studies on which the OSHA risk assessment was based were all available in the literature by 1980. So OSHA and NIOSH formed an asbestos working group that year to gather the scientific basis for a new standard. Their report, transmitted on April 17, 1980, concluded that "immediate action" was necessary because the current permissible exposure limit was so high that it will "cause several types of cancer and other lung disease."

The regulatory process began with a Federal Register notice on November 24, 1980, announcing the schedule to result in a final rulemaking by winter of 1981. But the 1980 presidential election intervened.

On February 10, 1981, the U.S. Chamber of Commerce submitted to President Reagan's Task Force and Regulatory Reform a list of 10 OSHA rulemakings that should be "prevented."

One of the 10 was the asbestos proposal because, as the Chamber claimed, the existing asbestos standard was "adequate." Eleven days later, with seemingly knee jerk precision, Budget Director David Stockman revealed in the Washington Post that the Reagan Administration was preparing to rescind the proposed asbestos rulemaking. Stockman stated that no regulation should be issued unless it is necessary and unless benefits to society are reasonably related to its costs.

To perform a cost-benefit test one has to assume that there is no value in saving lives and in protecting human beings from needless pain and suffering. This generally reduces the question to a determination of the economic value of lives saved compared to the cost of control.

For better or for worse, the tort liability litigation over asbestos has produced an average settlement figure of \$170,000 per case, according to a 5-year study completed in 1977 by the insurance service office, an arm of the insurance industry.

If Stockman had taken the lowest estimate of asbestos induced cancer that will be caused by continued exposure at the current permissible limit, which is 18,400 excess deaths, and had multiplied that figure by \$170,000 per case, he would have realized that bringing asbestos exposure under control would result in a benefit to American society of \$3.1 billion. The cost of containing exposure to a safe level is but a fraction of that figure.

While Stockman may not have had the benefit of the risk assessment document in early 1981, Secretary of Labor Raymond Donovan and Assistant Secretary for OSHA Thorne Auchter certainly were in a position to know of its existence later that year.

Yet, 5 months after the risk assessment was issued, OSHA published a notice in the Federal Register on January 13, 1982, revoking the earlier rulemaking schedule for asbestos that had been established by the Carter administration.

Instead of speeding up the regulatory process in light of the risk assessment, this new notice failed to set any deadline for the issuance of a new standard.

Mr. Chairman, the 3 years of delay that this administration has injected into the asbestos rulemaking process simply doesn't make any sense. Here is an agency charged with preventing worker exposure to serious hazards, yet it employs dilatory tactics when the medical and economic data so overwhelmingly favor it taking decisive and expedited action.

OSHA is simply out of touch with the realities and needs of the workplace.

Further Mr. Chairman, applying the figures that Dr. Nicholson provided to us today regarding excess cancers due to each year of exposure at the current allowable limit of 2 fibers per milliliter, you will come up with a figure of between 7,200 to 72,000 excess cancer deaths that are directly attributable to the 3 years of delay under the Reagan administration.

Thirty-five million tons of asbestos are now in place in office buildings, factories, oil refineries, chemical plants and schools.

Every day, some portion of this lethal substance is released into the air because of demolition or the need to make repairs on buildings or machinery.

The impact of intermittent low-level asbestos exposure has too long been ignored. When asbestos dust is released into the air, it breaks down into small invisible fibers which travel deeply into the lungs when inhaled. There the fiber acts as an indestructible, sharply pointed spear that relentlessly stabs away at the lung tissue with every breath.

Yet, low-level intermittent asbestos exposure is precisely the type of health hazard least controlled by the existing OSHA asbestos standard.

The current standard contemplates a Keystone Cops-type affair for any worker who attempts to seek its enforcement. A worker can't force his employer to follow the various provisions of the standard unless the employer knows that the asbestos exposure could be exceeding the limit.

Therefore, the employer is required to monitor the air. If the employer monitors, it usually takes several weeks for an air sampling result to come back from a lab. By then, the asbestos rip-out is typically over and the asbestos fibers are deep in the worker's lungs.

The vicious cycle of asbestos exposure causing asbestos victims must be stopped. This can only be done by treating asbestos as if it were a radioactive substance like plutonium. Plutonium is handled on a total containment theory. It is never supposed to be released into the open air. If there is ever a possibility that plutonium could be released, the worker is to be totally protected with supplied air-breathing apparatus.

In my prepared testimony is a presentation of what an emergency standard would look like that follows this total containment type theory. I purposely made this proposal very simple and it is not sophisticated at all. The reason is that it only follows a commonsense approach that would keep asbestos fibers out of workers lungs during asbestos rip-outs.

The so-called difficulty in air sampling for asbestos that Mr. Auchter brought out earlier today is simply not an issue with a total containment standard. You simply don't have to worry about all those so-called problems with air sampling with this kind of standard.

Therefore, there is no reason why within a week from today that OSHA could not issue my proposal as an emergency temporary standard.

Section 6(c)(1) of the OSHA act requires the Secretary of Labor to issue an emergency standard to take effect immediately if he determines that employees are exposed to a grave danger and that such action is necessary to protect employees from such danger.

Mr. Chairman, I submit that the record that you have made in this hearing today alone would serve as ample justification for the issuance of such a standard.

I thank you very much.

[Mr. Wodka's prepared statement follows:]

STATEMENT OF STEVEN WODKA
FREDERICK M. BARON & ASSOCIATES*
BEFORE
MANPOWER AND HOUSING SUBCOMMITTEE
HOUSE COMMITTEE ON GOVERNMENT OPERATIONS
JUNE 28, 1983

A few years ago, a group of oil refinery workers were required by their employer to work on a multi-story tower while an overhaul was in progress. That tower, called a fluid catalytic cracking unit, had thousands of feet of piping covered with asbestos. Asbestos block insulated the unit's boilers. Their employer, American Petrofina, was investing \$70 million to upgrade the unit. Eighteen hundred workers were involved.

The asbestos insulation was ripped out, sending dust and chunks of asbestos into the air. Asbestos dust settled over the floors and machinery. It was then swept up with brooms, sending more dust into the air. The asbestos containing debris was placed in plastic bags, dropped over the second floor, and then broke open upon hitting the ground. The employer never put up the required warning signs. The employer never bothered to sample the air to determine how much dust was in the workers' breathing zone. Worst of all, the employer refused to provide the workers with respirators so that they could place some barrier between their lungs and the asbestos dust, which one worker told me was coming down like snow.

These conditions occurred at least 30 times over a six month period in 1979. These workers, who were organized by the Port Arthur, Texas local of Oil, Chemical and Atomic Workers Union, were knowledgeable of their rights under the Occupational Safety and Health Act. They filed a complaint. OSHA inspected a few weeks later. OSHA found three serious violations of the asbestos standard and issued a few hundred dollars in penalties.

But the employer contested the citations. Under Section 10 of the OSHA Act, an employer is not required to correct a violation while it is being contested. The only exception to this provision is imminent danger situations. But OSHA has never considered the inhalation of a known cancer-causing substance to be an imminent danger.

* 1717 N Street, N.W., Washington, D.C. 20036, (202)775-8784

Conveniently for American Petrofina, the hearing on the contested citations didn't occur until the following year. By this time, the overhaul had been completed. The company, therefore, claimed that it had "abated" the violations by virtue of the fact that asbestos demolition work was no longer being conducted. The Labor Department's Regional Solicitor bought this specious argument, reduced the penalty to zero, and knocked the citations down from serious to non-serious. The union refused to sign the settlement and objected to it because it was wholly inadequate to protect the workers in the future.¹

While this case was pending, the asbestos demolition work had moved to another part of this tower which is 10 stories tall, reaching nearly 225 feet in height. The same exposure conditions occurred. The company failed to provide respirators, so the workers filed a second complaint. Again OSHA inspected, found 3 serious violations, and issued \$900 in penalties.

At this point, the now familiar scenario repeated itself. The employer contested, didn't correct the hazards, and cut a deal with the Labor Department Regional Solicitor. The union protested. In response, the attorney for the Labor Department contended that to prosecute the serious citations for the asbestos violations would cause the company to "suffer".²

I. The Flawed Statute

Nothing unusual happened in these two cases. Fundamental flaws that impede the hope of effective enforcement run rampant throughout both the OSHA statute and its asbestos standard. Consequently, a whole new generation of American workers are being marked for life as the asbestos victims of the future.

The Occupational Safety and Health Act is one of the weakest health and safety statutes ever passed by the Congress. Its maximum fine is \$10,000 per violation, which is pocket

¹Secretary of Labor v. American Petrofina Co. of Texas,
OSHRC Docket No. 79-6847.

²Secretary of Labor v. American Petrofina Co. of Texas,
OSHRC Docket No. 80-1671.

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change to most large corporations. It allows workers to be continually exposed to life threatening hazards while the employer contests the citation. In fact, one study³ found that employers may profit by contesting (rather than promptly complying) whenever the present use of abatement money is worth more than the proposed penalty plus the legal costs of delaying the abatement through litigation. In fiscal year 1982, OSHA issued a total of 181 citations for serious, willful and repeat violations of the asbestos standard. The average penalty per violation was \$216.35⁴.

The net result of this wet noodle of a regulatory system is that there is no incentive on employers to correct hazards before they maim, kill or expose workers to proven cancer-causing substances.

This experience is most poignant for occupational health hazards such as asbestos. For the young refinery workers who were exposed at the American Petrofina plant that I described earlier, it will be a minimum of 15 years, but typically 20 to 30 years from those fateful days in 1979, before their lungs will explode with the scarring or carcinoma due to that asbestos exposure. Yet, the likelihood that these workers will be able to tie their asbestos-related disease (which includes

³Final Report of the Interagency Task Force on Workplace Safety and Health (1978), p. III-15.

⁴Occupational Safety and Health Administration, Management Information System.

asbestosis, lung cancer and mesothelioma) to American Petrofina is virtually nil. For the less than 3% of workers who are currently able to prove such a causal connection⁵, the benefit levels under workers compensation are of little economic concern to their employer. For example, in a group of asbestos exposed workers who died from asbestos induced disease between 1967 to 1976, the mean settlement per workers compensation case was \$22,800.⁶

II. The Deceptive Standard

The OSHA asbestos standard itself was a total disaster from the day it was published in the Federal Register in June, 1972. The standard established a permissible exposure limit of 2 fibers greater than five microns in length per cubic centimeter. Again, the protection that the standard seems to provide is deceptive (a cubic centimeter only holds about a thimbleful of air). Two fibers per cubic centimeter is the exact equivalent of 2,000,000 fibers per cubic meter. The average working man inhales from 4 to 8 cubic meters of air during an eight hour work day. Therefore, the real permissible dose under the standard is 8,000,000 to 16,000,000 inhaled asbestos fibers per working day. Even in 1972, OSHA's hearing record was replete with medical evidence that such a high daily dose of asbestos fibers would induce cancer.

⁵An Interim Report to Congress on Occupational Diseases, U.S. Department of Labor (1980).

⁶Disability Compensation for Asbestos-Associated Disease in the United States, Mt. Sinai School of Medicine (1982).

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Since then, the medical community has developed models for predicting the cancer risk due to asbestos at varying exposure limits. Ironically, it was OSHA's own staff that compiled this data into a "Preliminary Risk Assessment for Asbestos" on August 12, 1981. This document was withheld from the public until recently.⁷

It is fairly apparent why the agency tried to keep this study from the public view. The risk assessment revealed that continued occupational exposure to asbestos at the legal limit of 2,000,000 fibers per cubic meter would result in a range of 18,400 to 598,000 excess lung cancer deaths based on an exposed population of 2.3 million workers. These shocking figures were in addition to 200,000 excess cancer deaths that the Mt. Sinai School of Medicine has estimated will occur over the next 20 years due to the legacy of asbestos exposure from World War II to 1972.

The studies on which the OSHA risk assessment was based were all available in the literature by 1980. So OSHA and NIOSH (National Institute for Occupational Safety and Health, Department of Health and Human Resources) formed an Asbestos Working Group that year to gather the scientific basis for a new standard. Their report, transmitted on April 17, 1980, concluded that "immediate action" was necessary because the

⁷ The draft risk assessment was placed in OSHA's public docket office on March 4, 1983. Previously, a Freedom of Information Act request made by Frederick M. Baron & Associates for the same document was denied by OSHA on September 9, 1982.

current permissible exposure level was so high that it will "cause several types of cancer and other lung disease."

The regulatory process began with a Federal Register notice on November 24, 1980, announcing a schedule to result in a final rulemaking by Winter 1981.

But the 1980 Presidential election intervened. On February 10, 1981, the U.S. Chamber of Commerce submitted to President Reagan's Task Force on Regulatory Reform a list of 10 OSHA rulemakings that should be "prevented". One of the 10 was the asbestos proposal because, as the Chamber claimed, the existing asbestos standard was "adequate".

Eleven days later, with knee jerk precision, Budget Director David Stockman revealed in the Washington Post that the Reagan Administration was preparing to rescind the proposed asbestos rulemaking. Stockman stated that no regulation should be issued unless it is necessary and unless benefits to society are reasonably related to its costs.

Stockman, of course, was referring to the familiar cost-benefit balancing test, which the Supreme Court ruled⁸ later that year could not be applied to OSHA's promulgation of health standards. But even putting the Supreme Court decision aside, Stockman's rationale still didn't make sense when it came to asbestos.

⁸American Textile Manufacturers Institute, Inc., et. al., v. Donovan, et. al., 101 S. Ct. 2478 (1981).

To perform a cost-benefit test, one has to assume that there is no value in saving lives and in protecting human beings from needless pain and suffering. This generally reduces the question to a determination of the economic value of lives saved compared to the costs of control. For better or for worse, the tort liability litigation over asbestos has produced an average settlement figure of \$170,000 per case, according to a five-year study completed in 1977 by the Insurance Service Office, an arm of the insurance industry. If Stockman had taken the lowest estimate of asbestos induced cancer that will be caused by continued exposure at the current permissible limit (18,400 excess lung cancer deaths) and had multiplied that figure by \$170,000 per case, he would have realized that bringing asbestos exposure under control would result in a benefit to the American society of \$3.1 billion. The cost of containing exposure to a safe level is but a fraction of that figure.

While Stockman may not have had the benefit of the risk assessment document in early 1981, Secretary of Labor Raymond Donovan and Assistant Secretary for OSHA Thorne Auchter certainly were in a position to know of its existence later that year. Yet, five months after the risk assessment was issued, OSHA published a notice in the Federal Register on January 13, 1982, revoking the earlier rulemaking schedule for asbestos that had been established by the Carter Administration.

Instead of speeding up the regulatory process in light of the risk assessment, this new notice failed to set any deadline for the issuance of a new standard. OSHA has since announced its intention to begin a rulemaking proceeding on asbestos this summer and claims that it will issue a final rule by December, 1983.

The three years of delay that this Administration has injected into the asbestos rulemaking process simply doesn't make any sense. Here is an agency charged with preventing worker exposure to serious hazards, yet it employs dilatory tactics when the medical and economic data so overwhelmingly favor it taking decisive and expedited action. OSHA is simply out of touch with the realities and needs of the workplace.

What happened at the American Petrofina plant is happening throughout the United States at hundreds of work sites every day. Thirty-five million tons of asbestos are now in place in office buildings, factories, oil refineries, chemical plants and schools. Every day, some portion of this lethal substance is released into the air because of demolition or the need to make repairs on buildings or machinery.

The impact of intermittent low-level asbestos exposure has too long been ignored. When asbestos dust is released into the air, it breaks down into small invisible fibers which travel deeply into the lungs when inhaled. There the fiber acts as an indestructible, sharply pointed spear that

relentlessly stabs away at the lung tissue with every breath.

At our law firm, we are regularly working on cases where the client had brief, low-level asbestos exposure, yet developed an asbestos-related disease:

- a baker who 40 years ago worked in a shipyard for a few years drilling holes has pleural mesothelioma.
- a chemical plant operator who watched asbestos insulation being installed and removed while tending his still, dead from asbestos-related lung cancer.
- a laborer in a plastics plant where asbestos was used as a raw material who unloaded bags of asbestos from railroad cars and swept the floors, has pleural asbestosis.

These cases of asbestos-related lung disease were predicted in a 1979 study⁹ of chemical plant workers who were "bystanders" to those directly engaged in asbestos work. The study found that 30% of the bystanders, who only had indirect exposure, had chest x-ray abnormalities caused by asbestos. While the risk of disabling asbestosis is low for these workers, the study indicated that:

Nevertheless, the risk of lung cancer and mesothelioma is of concern because accumulated experience indicates that low-level asbestos exposure (indirect occupational, neighborhood, or household exposure) is sufficient to result in a significant risk of developing mesothelioma.

Yet, low-level, intermittent asbestos exposure is precisely the type of health hazard least controlled by the existing

⁹"Asbestos Disease in Maintenance Workers of the Chemical Industry," Lillis, et. al., Annals of New York Academy of Science (1970), pp. 127-135.

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OSHA asbestos standard. The current standard contemplates a Keystone Cops-type affair for any worker who attempts to seek its enforcement. A worker can't force his employer to follow the various provisions of the standard unless the employer knows that asbestos exposure could be exceeding the limit. Therefore, the employer is required to monitor the air. If the employer monitors, it usually takes several weeks for an air sampling result to come back from a lab. By then, the asbestos rip-out is typically over and the asbestos fibers are deep in the worker's lungs.

But if the worker exercises his rights under the law, will OSHA be there to back him up? In an incredulous case¹⁰ that began in 1981, OSHA was successful in getting a Federal judge to rule that a worker is protected against discriminatory discharge when a worker first complains to the news media and then to OSHA. Here, a worker named Ronald Fent was involved in renovation work on a university dormitory which was releasing clouds of asbestos dust into the air. Fent's complaints to the news media and to OSHA resulted in OSHA citing the employer and the employer firing Fent.

When Labor Department Solicitor Timothy Ryan heard of the favorable Federal Court decision that would lead to Fent's reinstatement, Ryan was described as "angry"¹¹ that his attorneys had brought the suit. Ryan then "started exploring ways to

¹⁰Donovan v. R.D. Andersen Construction Co., Inc., 552 F. Supp. 249 (D. Kan. 1982).

¹¹New York Times, October 19, 1982.

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undo the judge's decision"¹² by ordering his "regional attorneys to try to settle"¹³ the case which they had just won.

III. A Proposed Remedy

The vicious cycle of asbestos exposure causing asbestos victims must be stopped. This can only be done by treating asbestos as if it were a radioactive substance like plutonium. Plutonium is handled on a total containment theory. It is never supposed to be released into the open air. If there is ever a possibility that plutonium could be released, the worker is to be totally protected with supplied air breathing apparatus.

Likewise with asbestos, it should be required that:

- 1) All removal of old asbestos be conducted so as to totally isolate the worker and the environment from the asbestos dust.
- 2) In areas where asbestos is to be removed, dust proof barriers must be erected.
- 3) Workers shall automatically be provided with protective clothing and self-contained supplied air positive pressure breathing apparatus.
- 4) All asbestos waste and debris must be carefully contained and disposed.
- 5) A rebuttable presumption shall treat any existing insulation materials as asbestos-containing unless the employer or owner can prove otherwise.
- 6) Workers shall be fully apprised of all the life threatening hazards of asbestos before they begin removal work.¹⁴

No part of my proposed standard is very sophisticated. It only follows a common sense approach that would keep asbestos

¹² Washington Post, October 20, 1982.

¹³ Legal Times, October 18, 1982.

¹⁴ As a concession to Johns-Manville, OSHA in 1972 went along with JM's written request that the asbestos standard not require the use of the word "cancer" in any of the standard's labeling or posting provisions.

fibers out of workers' lungs during asbestos rip-outs. There is no reason why, within a week from today, that OSHA could not issue my proposal as an emergency temporary standard. Section 6(c)(1) of the OSHA Act requires the Secretary of Labor to issue an emergency standard to take effect immediately if he determines that employees are exposed to a grave danger and that such action is necessary to protect employees from such danger.

All the necessary data and facts on the asbestos crisis have long been before OSHA. Any hesitancy by the agency to act immediately and forcefully is only demonstrative of its recurrent lack of will to enforce the law.

Mr. FRANK. Thank you.

Mr. Wodka, on the question of an emergency standard. Do you know if people have approached OSHA previously and asked about an emergency standard?

Mr. WODKA. I understand the International Association of Machinists has filed within the last few weeks a petition for an emergency temporary standard on asbestos.

Mr. FRANK. You have mentioned that you have been concerned with the issue. We had some testimony from Ms. Seminario about the lack of enforcement. I wonder whether that is something you have any particular knowledge about?

Mr. WODKA. Yes, when I was with the oil, chemical, atomic workers for 13 years, almost my entire time was spent assisting local unions in getting enforcement of OSHA standards in the field. It was quite a saddening experience. I pointed out in my prepared text a typical example where an employer was overtly violating the asbestos standard. And not only once but in two separate instances OSHA inspected the facility but reduced the violations for the asbestos standard from serious to nonserious.

There is simply no way that a violation of the asbestos standard can be considered nonserious.

Mr. FRANK. The standard that you propose is an emergency standard. I would assume that you would like to see that as a permanent standard as well?

Mr. WODKA. Yes. The reality of the workplace is this—a lot of people don't seem to understand this. There is a not a whole lot of new asbestos being put into the workplace. The problem is what is out there right now. The problem is millions of workers who come in contact daily when they are told to repair this machine, or take out this piece of pipe, and it is covered with asbestos, and have to rip the asbestos off. The standard doesn't deal with that kind of exposure.

This folderol that you saw earlier today with air sampling is not going to help that worker at all. That job is going to be long completed by the time any kind of air sampling data comes back. The only protection for him is some kind of way to totally separate his lungs from those asbestos fibers. That is why it has to be a total containment of those fibers.

Mr. FRANK. There are two reactions I want to test on you with regard to that.

One is that given the initial failure by the society to regulate asbestos, even had we in 1972 adopted the best standard in the world, there would still be enormous problems because when you don't regulate and you allow these substances to permeate the society, you build in, literally build in, a series of terrible health problems that are very difficult to undo.

And that, I take it, because we are told, well, we have got to proceed cautiously, we have to balance everything, et cetera, the problem, of course, is that some of these things go ahead while we are proceeding cautiously. And the cost of undoing the mistakes in this area, really are enormous.

Mr. WODKA. They are enormous. The very interesting thing here is that asbestos is the only toxic material where you have such hard data, both on its medical effects and the cost of disease, death and disease, caused by it.

The incredible thing is that there is still this debate, as you saw at this table today, over whether we should do something or what are we going to do, and this and that. That, to me, is stupidity.

Mr. FRANK. The standard you mentioned, is supposed to apply—when you say it is irrelevant to that worker, what you are saying is, by the time anybody could make a written proposed remedial action, he has moved on to the next job because the demolition situation is—

Mr. WODKA. Precisely. What that worker needs is, he needs to know that, No. 1, that any time that he is sent up to rip out anything that looks like insulation, not just asbestos, but looks like insulation, there is a presumption that it is asbestos. So, first of all, he doesn't have to go into a big debate with the employer as to whether or not it is or it isn't asbestos. That presumption is there. Once he is told of such a presumption he knows that he doesn't have to rely on whether or not the air level is going to be above or below the standard.

He knows that he either does the job with the proper equipment or he doesn't have to do the job.

Mr. FRANK. I think it is important to note, and I think we should note, that in some other cases the dispute over the size of occupational safety has switched a little bit in some cases. For instance, in textiles, some of the antiregulators have been saying, well, just equip the worker with enough things and we don't have to worry about the ambient air.

What you are saying here is that given the nature of asbestos and the nature of the kind of jobs we are doing it is not an ongoing thing but it is a one-shot deal. There is no alternative but to protective clothing.

Mr. WODKA. There are two things in these rip-outs. Yes, there is the protective clothing and the breathing apparatus. But, also, we

represent clients in our law firm who never did any direct work with asbestos. They simply were bystanders. For example, there are chemical operators in a plant and they had to tend their piece of machinery, but there was somebody else in that part of the building who was doing asbestos installation work or rip-out work. The client died of asbestos-induced lung cancer and he had no direct exposure.

So I am also advocating that when these rip-outs occur that all of the surrounding workers need to be protected. And the way to do that is to put up some kind of——

Mr. FRANK. It is not just the surrounding workers, but the passersby, which——

Mr. WODKA. Oh, yes.

Mr. FRANK [continuing]. Sounds like what we really need is an EPA/OSHA linkage here that is better than them passing paper back and forth and suggesting that it is the other one's responsibility?

Mr. WODKA. That is correct. There is this thing on TV the other day where they blow up these buildings with dynamite and you see this big cloud of dust going up in the air and you hear this cheering. I don't know if you saw this on TV just the other day.

Mr. FRANK. You are talking about the side of the Tip O'Neill building, among other things.

Mr. WODKA. Yes, that's right.

Besides the fact that they are going to get a new building there, I don't know what they are cheering about. Because when they blew that building up, they must have released tons of asbestos dust into the air.

Mr. FRANK. So that we are really talking about an OSHA situation but an EPA situation where there has to be some alternative method. Are there alternative methods? What do you do in a situation like that? Do you put a big bubble up and then what would you do?

Mr. WODKA. I think you just don't use that technique. Maybe you have to use a slower technique. Everyone in that community there in Boston now has got another layer of asbestos dust to breathe in.

Mr. FRANK. I won't tell the Speaker.

I thank you for your testimony. I apologize for that interruption.

This hearing is about to adjourn. I am going to insert into the record a copy of the transcript of the NOVA program No. 1006 which was broadcast on asbestos.

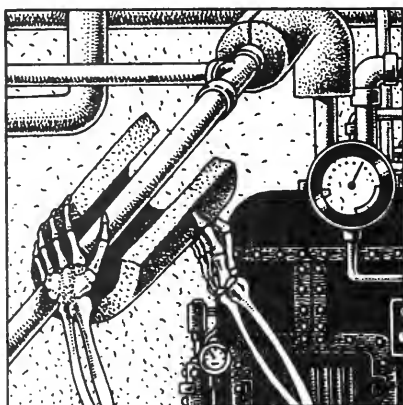
[The information follows:]

NOVA #1006

This program was originally broadcast on PBS on March 1, 1983.

Major funding for NOVA is provided by this station and other public television stations. Additional funding is provided by the National Science Foundation, and the Johnson and Johnson Family of Companies.

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Asbestos: A Lethal Legacy

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Members of a television production crew wear three-layered protective suits with their own oxygen supplies to film the removal of asbestos from apartments.

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JOHN WILLIS

These mountains of white powder are the foundation of an international multi-billion dollar industry: asbestos. World-wide production has topped three million tons annually. After World War II, asbestos use took off in the defense and space industries, and the possibilities seemed limitless. Most famous as a fire-protector, asbestos was woven into the fabric of our daily lives. It's versatile and nearly indestructible fiber was once called the magic mineral. But it is people like these who have paid the highest price for society's use of the magic mineral.

I'm John Willis. NOVA has brought me here to the United States to make a special presentation of a program about asbestos that I made for British television. Not that asbestos is just a British problem. It's something that effects us all. Indeed, much of our film was shot here in the states and in Canada. Nearly 25 million Americans have been directly exposed to the dangers of asbestos, risking serious illness. When this program was shown in Britain last year, it provoked fierce debate about the dangers of asbestos. It challenged the British government and the asbestos industry to improve working conditions. As a result, the government lowered the maximum safe level of exposure to asbestos dust by half. But here in America, the old, higher level still exists. That means that thousands or even millions of Americans are still legally exposed to levels of asbestos dust that are now considered far too dangerous in Britain. We are presenting this program to draw attention to a problem that is now of world-wide concern. Our story begins in a mining town in Canada that is actually called Asbestos.

These Canadian mines supply over half the western world's white asbestos, including most of the 95,000 tons imported into Britain every year. There are three main types of asbestos, but the white or chrysotiles is the most commonly used, both in Britain and America.

Mining is on a massive scale. Asbestos in Canada is big business. Exports are worth 600 million dollars a year. 70 percent of all asbestos used is in the construction industry. And it is found in over 3,000 different domestic and industrial products.

Inside these rocks are veins filled with mineral fibers. In a continuous crushing and milling process the fibers are separated from the host rock. Few other minerals are as versatile as asbestos. The fibers can reinforce cement or be woven into fire-resistant fabric. Some fibers are visible to the human eye. But it is the millions of smaller invisible particles that are so deadly. Two million of them could fit on a pinhead.

LAWYER

You do solemnly swear that the testimony that you are about to give in this matter will be the truth, the whole truth, and nothing but the truth, so help you God.

Asbestos: A Lethal Legacy

2

JOHN WILLIS

Asbestos is killing this woman.

LAWYER IN COURTROOM

Please state your full name.

JOHN WILLIS

Too ill to go to court, lawyers have videotaped her evidence.

COURTROOM SCENE (CONTINUED)

Lawyer: Could you describe how you would see the asbestos particles as they affected you?

Mary Johnson: Well, they look like snowflakes you know. Real stringy, and they come down. They were pretty thick at that time.

Lawyer: What is it that you are presently suffering from?

Mary Johnson: Lung cancer and asbestosis. It's growing, it's all like grapes, all lumps.

Lawyer: Since then how has your physical condition progressed?

Mary Johnson: Look at me.

JOHN WILLIS

Next day, Mary Johnson died of cancer. Ray Price is suffering from asbestosis, a disease that we have known about for generations. One of the three most prevalent causes of death associated with exposure to asbestos. It is a respiratory illness which gradually diminishes his capacity to breathe. Associated with prolonged exposure it can take up to 20 years before the effects are felt. As his lungs become thick with scarring, Ray Price will eventually suffocate. Alice Jefferson is also dying from an asbestos related disease--she has a rare form of cancer.

ALICE JEFFERSON

Hello little flower, have you had a good day?

JOHN WILLIS

Alice's cancer is called mesothelioma or cancer of the lung lining. It's invariably fatal. The only established cause--the dust from asbestos. Alice is 47 years old. Thirty years ago, in 1952, when she was just 17, Alice worked for nine months at Cape Asbestos in Yorkshire, England.

JOHN WILLIS/ALICE JEFFERSON INTERVIEW

John Willis: Were you ever warned that working there could be dangerous, you could finish up...?

Alice Jefferson: No. We used to fool about. We used to make wigs out of that, you know. You know how you feel at work. We used to make wigs out of asbestos and put them on our heads and you know...No.

John Willis: And management never said?

Alice Jefferson: No, I never thought it was dangerous at all.

JOHN WILLIS

Now Alice is so ill, her 65 year old husband Tom, must look after their two youngest children, Patsy, age five, and Paul, age 15.

A few months ago, Alice's doctor told her that she was dying of mesothelioma

ALICE JEFFERSON

Well, I jumped around the room like a frog. I did. That's what I did. I had a feeling that I had something serious by then, you know, because I wasn't getting any better. And I just said, "You've come to tell me that I've had it haven't you?" She says, "Yes" and she says and er...I says, "How long have I got then?" and she says, "three to six months" and when you think that you know, that it's the results of working, you know, for a paid wage, at a job that you didn't think was dangerous, it never entered your head that it was dangerous, it makes me feel right bitter. Because I mean I know I am 47, but I had a little girl, you know, when I was 43, and I mean she's only young isn't she, and they are telling me that I've only got six months to live. I've got a lot to feel bitter about really. I suppose it is selfish really, isn't it. Because I worry about me not being able to see their best years, you know. Seeing our Paul, you know, he's me only lad, and I mean our Patsy is only five. I don't know whether it's a selfish thing or not, but I think every mother wants to watch her kids develop and I'd have like to have been there and watched over them.

JOHN WILLIS

We asked Alan Mearns, Alice's specialist, if asbestos was always the cause of mesothelioma cancer.

ALAN MEARNNS

Personally I feel that all mesotheliomas are related to asbestos and it is really a question of making this connection, and I think in the past the connection wasn't widely recognised and was not made. That my generation, certainly my immediate generation, of professional colleagues nationally do not see mesothelioma in the absence of a history of exposure to asbestos.

JOHN WILLIS

Long before Alice's exposure to asbestos, the manufacturers knew the danger--this factory inspector's report was the first warning sign. That was in 1898, 84 years ago. By 1906, a British worker reported to his doctor that his team of ten asbestos workers were all dead. Average age--30.

By 1931, the link with disease was so clear the government passed its first asbestos regulations. They ordered that there should be no asbestos dust in the workplace. By 1935, the link between lung cancer and asbestos became recognized.

Fourteen years after that cancer risk was known, a doctor from America noted that a British company, Cape Asbestos, in South Africa, used young children to process raw asbestos by hand. Standing over them, a supervisor with a whip. Even by the age of 12, he discovered, several child workers had asbestosis and heart failure.

By 1955, Oxford University scientists found that lung cancer among British asbestos workers was ten times the national average. Smoking increases the lung cancer risk for asbestos workers by 55 times. In addition to lung cancer, by 1960, doctors had established the lethal and once rare form of cancer, mesothelioma, was also caused by asbestos. Finally in 1969, the accumulation of years of evidence forced the British government to introduce new workplace regulations.

In determining what they called a "safe" dust level--that is how many fibers can be breathed in per hour--they only took into account the risk of asbestosis, not lung cancer or mesothelioma. But as asbestos cancer can take 20 or 30 years to develop, the effects of controlling dust levels can't be seen for several decades. Asbestos has been regulated for over half a century. How many victims have been claimed?

DAVID GEE

It's been the biggest killer that we know of in the occupational health field. It's killed thousands and thousands of people. Most of the others that we know of have really only killed hundreds. So it is the granddaddy of the occupational health killers. And it has not only affected work people, it has affected their wives, their children, their relatives, and also members of the public. Who because we now know that it gives cancer as opposed to just an asbestos-dust-clogging-of-the-lungs disease. It kills members of the public who only get a small exposure.

JOHN WILLIS

That small exposure could come from anywhere. Thousands of tons of asbestos are in pipe insulation. Thousands more are in the roofs and walls of buildings. Asbestos is used in many domestic products, but it wasn't until 1976, 78 years after the first danger sign, that the British industry

JOHN WILLIS (Continued)

introduced warning labels on some but not all of these products. But how effective is that warning?

BARRY CASTLEMAN

In the United States, I don't think that this would be considered by any jury to be adequate warning that the material can cause such diseases as cancer, and fatal asbestosis. It says, if you read it carefully, it says "Observe the safety rules." It doesn't say the stuff can give you cancer. It says, "Take care with asbestos." It almost reads like an advertisement that asbestos will take care of you, so use more of it. This is ridiculous as a warning, and it is criminal on the part of the British government that they let this go for a warning in their country.

JOHN WILLIS

These "spacemen" are preparing to remove asbestos from a London housing project. It's such a dangerous job, the men wear masks with a separate oxygen supply and three layers of protective clothing, which must be decontaminated after use.

In these apartments, asbestos board for insulation is on the walls of five rooms including this child's bedroom. As local residents were the first to realize--in damage to them all--and dangerous dust could be released.

Over six million tons of asbestos have been put into houses, schools and hospitals all over Britain. Now this one London borough has 5,000 dwellings to remove asbestos from. It's an expensive job that must be very carefully carried out. This special unit is trained to handle asbestos as if it were radio-active waste. It must be safely buried immediately at a specially licensed site.

This extraordinary landscape is in Quebec, Canada. Here whole townships are dwarfed by the white asbestos mountains. The mines pump out asbestos waste day and night. The locals call it white gold--the Arabs have their oil, they say, we have our asbestos.

Several giant American companies, including the Manville Corporation have dominated this \$480 million industry. In addition, a British company, Turner and Newall for 44 years owned the Bell mine here. "Death rates in the asbestos mining towns," say the companies "are no higher than the general population."

But what about Lisa Garneaux? Dead from cancer at 36. As a child she slid down the giant slag heaps that shadowed her home. Her family still lives beneath the same white mountain. With no alternative jobs, her son is already an asbestos miner, and her daughter plays beneath the same slag heaps.

And then there is Roger Jean. He worked for many years at a white asbestos mill. Now he can't even drive a car without oxygen. In 12 years, his unions

JOHN WILLIS (Continued)

say they have had more than 1,000 claims from men like him. Yet the Quebec government reported that only two out of every 100 workers here suffer from asbestosis like Roger Jean. His union called in a team of scientists from Mount Sinai hospital in New York to do an independent study of long-term workers. They found 75 out of 100 workers have lung damage from asbestosis or lung cancer. Paul Formby comments:

PAUL FORMBY

Whether it is official or not, they will minimize the hazard and the suffering of the workers because obviously this will make it more difficult to sell the product which is hazardous. They have to pay compensation claims and it is not in their economic interests to say really what the severity of the situation is.

JOHN WILLIS

The American research team identified over 700 workers with damaged lungs. Most of them have never been notified. Despite the health danger, mining asbestos means thousands of jobs in Canada. Regardless of Mount Sinai Hospital's finding, the company still wrote in a public relations document that we were given in 1982, "Asbestos is without a shadow of a doubt one of the safest products on the market today."

ALICE JEFFERSON AND SISTER

Alice: *I don't like to go down that room you know.*

Sister: *No, no.*

Alice: *Because if I go down that room, I've got to...*

JOHN WILLIS

In Yorkshire, Alice is still struggling against her cancer.

ALICE JEFFERSON AND SISTER

Alice: *My friend is there, but I can't get up without help.*

JOHN WILLIS

This is her first day out of bed for three weeks. She used to walk miles over the local hills. Now she can only walk with the help of her sister.

ALAN MEARNS

She's tough and realistic and you can't kid this lady. This lady knows exactly what the score is. She's watched many of her friends and neighbors who have suffered this same disease and she knows exactly what is happening. And she is doing her best to make sure that her family suffers as little as possible.

ALICE JEFFERSON

My Patsy doesn't know. She just knows that I can't pick her up anymore, you know. She's always saying, well before I went into hospital for that operation, she used to say, "When are you going to have that jump off Mum, then you'll be able to lift me up and play with me." And now you know, she just knows I can't pick her up and of course she's too young to tell. I have told my boy. He's 15 you see. I told him when we were walking along the road one day. I thought it was the best time to tell him then. You know--so he won't cry so much. But he did.

JOHN WILLIS

Apart from the victims, the rest of Britain remains largely ignorant of the real dangers of asbestos. It's different in America.

TV COMMERCIAL

You could be a casualty of World War II and not know it. During the war one of the materials workers used to build this ship was called asbestos, and after all these years, they found that working around and breathing asbestos may cause bad lung diseases, including cancer.

Millions of people have worked around asbestos dust.

JOHN WILLIS

The asbestos epidemic is so big here that the government even televises warnings.

TV COMMERCIAL

Maybe you worked around asbestos years ago. Maybe you will get sick, maybe you won't. Don't take any chances.

WHITE LUNG ASSOCIATION MEETING

Voice: *Would you please rise and salute the flag?*

JOHN WILLIS

But those warnings came too late for these victims. They are part of an epidemic caused by white and brown asbestos. So this group is called the White Lung Association.

WHITE LUNG ASSOCIATION MEETING

Voices: I pledge allegiance to the flag...with liberty and justice for all.

This dreadful disease does not care about age, or the amount of money you have, or how big you are, or how strong you are. It cuts you down.

JOHN WILLIS

It is estimated that 25 million Americans have been exposed to significant amounts of asbestos on the job. This New York hospital is the world's leading center for the study of asbestos disease. Dr. Irving Selikoff's pioneering work uncovered a new problem.

IRVING SELIKOFF

It wasn't asbestos workers, miners and people in factories making these products who were getting these diseases. But these were people who were using asbestos products. Insulation workers never worked in a factory. They were simply using this material. Took it out of a box and put it on to boilers and put it on to pipes and mixed cement and plaster and things with it and so forth. Well, that raised a whole new set of questions. Because for every worker who manufactured a product or mined it, there were more than a hundred who used that product. There were millions of people who worked in our shipyards in World War II -- four-and-a-half million. There were millions of people working in our very important construction industry. And in a host of other industries that used asbestos products. So that by 1964, we had our really bad news before us.

JOHN WILLIS

Dr. Selikoff's team predicts that every 58 minutes between now and the end of the century, an American will be killed by asbestos. That's a death toll of nearly 200 thousand people. New evidence suggests that these tiny fibers can cause cancer, not just in the lungs but elsewhere in the body.

AUERBACH

We found it in the thyroid gland which is in the neck. We found it in the brain. We found it in the intestines. We found it in the spleen. We found it in the liver. And so we concluded that asbestos fibers can be carried by way of the blood stream to different organs in the body.

JOHN WILLIS

The National Institute of Occupational Health determined in 1980, "There is no evidence for a safe level of asbestos exposure. Even at short exposure periods--one to three months--significant disease can occur."

This little boy has never seen his father. Five weeks before he was born his father died. John Rossi was a Wall Street lawyer. His asbestos exposure was extremely slight. At age 20 he worked in a warehouse loading asbestos sheets on to trucks for just two weeks. But those two weeks were enough. At 32, he died of mesothelioma.

NANCY ROSSI

I've lost the most important thing in my life. I think it's very lucky when one man and one woman can somehow find each other and love each other as much as John and I did. We were best friends to each other. Laughed a lot. Had great plans for our future together. Looked forward to growing old together. I...it's ...it has taken away from me. And from him.

JOHN WILLIS

America's most famous mesothelioma victim, Steve McQueen. Exposed to asbestos as a marine and in some of his films, he tried every treatment his money could buy. In a Mexican clinic he recorded this tape.

STEVE MCQUEEN

Congratulations to your wonderful country on the magnificent work that the Mexican doctors assisted by the American doctors are doing at the Playa Santa Maria Hospital in helping in my recovery from cancer. And thank you for helping to save my life. God bless you all. Steve McQueen.

JOHN WILLIS

Soon after this statement was recorded, Steve McQueen died.

Don Carson is a truck mechanic. At work, he used to blow the white asbestos dust out of brake drums when he was changing the linings. During school vacation his sons used to help him. In 1980, when his eldest boy Johnny was eleven, his parents were told that their son had the asbestos cancer, mesothelioma.

MRS. CARSON

Oh, I really went to pieces and so did John. I think we just looked at each other and John said, "why me?" And I couldn't answer him. And I called Don and I told him that they were malignant and he just went to pieces too. You know, this always happens to somebody else. It's not going to happen to you. And I think we are really...you know when I was

MRS. CARSON (Continued)

told what it was, I knew it was incurable, because they had told us that. And there wasn't anything we could do. We had to sit and watch our son die and not be able to stop it.

MR. CARSON

I never had anything hurt so bad in my life. John could do 50 push-ups last summer. And then just before he died he couldn't even lift his foot back up on the wheelchair. And that just killed me because he was so athletic.

MRS. CARSON

We watched his...especially his arms and legs. They shrank to just nothing. There was no muscle left, and if you went to touch him it was very painful because all there was was bone. I couldn't hug him. If you hugged him, it hurt. You couldn't hold his hand. You couldn't sit next to him. You tried and he'd be quiet about it, but you knew it hurt. Just hurt him deep, just to hug him. There was nothing left.

JOHN WILLIS

On April 13th, 1981, John Carson had a small party at his home. That night he died in his sleep. He was 12 years old.

MRS. CARSON

Just for one day, one day, I'd like those asbestos manufacturers to have the pain and to have the cancer for one day. Just watch him. And I can guarantee they would never do it again.

JOHN WILLIS

For 18 months Tony Richards blew out brake drums daily, just like John Carson's dad used to. Thousands of British and American mechanics do the same.

TONY RICHARDS

That's the way I was showed, in the garage when I first started out. That's the way they showed me to do it. Just blow it out with an airline.

JOHN WILLIS

Are you worried about your own health at all from blowing out brake drums?

TONY RICHARDS

Well not really. I don't really know what it does to you. So I'm not really worried about it. If I knew how it can affect you, then obviously I'd pay a bit more care. But I've never really read what it does to you. All it does is...there's a warning on the packet that it can damage your health, but that's as far as it goes.

JOHN WILLIS

Overgate Hospice, Yorkshire. Alice has been moved here for treatment to ease her intense pain. The doctors gave her six months to live and already she has survived for one month beyond that. Alice has now requested her compensation from her former employer. She is certain her cancer is due to their failure to provide safe working conditions.

Throughout Britain there are 800 work places using asbestos--32 of them large factories. It's a multi-million dollar industry. To promote asbestos, the industry produces a steady supply of glossy brochures. In 1976, nationwide advertising like this cost them over two million dollars.

Turner and Newall, which has several American subsidiaries is the most powerful company in the industry. Gross income, 995 million dollars.

This is their Rochdale factory--the biggest asbestos textile plant in Europe. It was here that Samuel Turner began using asbestos 103 years ago. Turner's prides itself on its pioneering work in health and safety. In 1920 they said, "The workshop shall be as a sanctuary into which men shall enter with joy in their hearts and laughter in their eyes."

Refused permission to film inside, we stopped workers and asked them how much they knew about asbestos disease. Turners's are clear--"all workers are fully informed."

JOHN WILLIS INTERVIEWS FACTORY WORKERS

John Willis: Do you know what diseases you can get from asbestos?

Man: I don't know to be honest with you.

John Willis: Do you know what diseases you can get from asbestos?

Woman: Oh, I do yes.

John Willis: Can you tell me what they are?

Woman: Asbestosis for one.

John Willis: Have you ever heard of mesothelioma?

Woman: I've heard of it, yes.

John Willis: Do you know what it is?

Woman: Well, it's chest complaints.

John Willis: It's cancer. Did you know that?

JOHN WILLIS

For 50 years, Turner's has been Britain's showpiece asbestos factory. Since the 1920's every investigation into asbestos disease--not just in Britain, but also in the United States--has depended on evidence from here. The latest report came from the government's 1977 Asbestos Commission, which was concerned with the increasing death rate in British factories. Evidence from Turner's model factory was central in the conclusions of the final government report published two years later.

Turners's is proud of the cleanliness in this factory. Thousands of dollars have been spent on equipment, the monitoring of the asbestos dust, and the regular medical checkups seem impressive. In 1978, Turner's was very confident of conditions inside the factory. They told their unions, "It is extremely unlikely that anyone commencing work at TEA will have his health affected at all."

However, scientists from Oxford University predict that after a lifetime of work here, the number of these workers who will die of mesothelioma, lung cancer, or chest disease, may be as high as one out of ten.

Turner's also told the Asbestos Commission that in the weaving shed, which for 30 years has kept to below the legal limits for asbestos dust, they have no disease whatsoever. That not one single weaver has contracted asbestos-related disease.

But what about this man that worked in the weaving shed? Records show that he had suspected asbestosis, full eight and a half years before Turner's stated to the Commission that they had no disease at all among weavers. He wasn't the only one. As these records from that same year, 1977, show, the number of weavers with suspected asbestosis--13. Turner's also stated that they had 48 cases of mesothelioma, but that none of these could be described as cases of slight exposure to asbestos.

Margaret Chrimes worked here as Turner's receptionist. Emma Marshall was Turner's office cleaner. They both died of mesothelioma.

This is Turner's own company list of mesotheliomas. Among them the exposure times: 16 months one year, seven months, five months, three years, and the last one, a woman exposed for just ten days.

In this union-sponsored questionnaire, Turner's said the number of mesotheliomas in the previous four years was just three. By examining the death certificates in the same period, we found six. Turner's also told the unions at the same time, the level of asbestosis between 1950 and 1979 was just 20. We found 81. We looked at another of Turner's factories.

Glasgow--for nearly 40 years, Turner's dumped waste asbestos into a huge hole at their factory here. Children could easily get into the 18 acre site. Tons of asbestos slid into the River Clyde. In 1981, at public expense, the huge pit was properly covered. The job was so dangerous the workmen had to wear full protective clothing.

TED RUSHWORTH

I'm on record as calling it a biological bomb, and that is sincerely what I believe it to be. It's a long term health hazard and this has been blowing about asbestos dust in this area for very many years. And the result of that, I am quite certain, will lead to deaths. No one knows how many in the coming years. This is a sort of tragic memorial to my mind in the future. This site has now just got to stay clear for eternity. As far as I can see. And that is what Turner's has left to Clyde Bank.

JOHN WILLIS

And what kind of legacy has Turner's left overseas? Turner and Newall is a huge multinational with asbestos interests in over 20 different countries. Are the conditions there up to British standards?

In India, Turner's has interest in five factories. This is Bombay. As health regulations have tightened at home, western asbestos companies have moved into the Third World.

This Indian factory was opened by Turner's in the 1930's, a few years after the first regulations were introduced into Britain. It may have seemed benign paternalism then to build housing and schools within the factory compound. Now we know that for young children who live next door to a factory it must be highly dangerous. But in 1982, they still do. Particularly dangerous when just a few yards down from the school and houses we found piles of scattered asbestos waste open to any adventurous child. One X-ray study here showed that 352 men--that is well over one in three workers--had some form of asbestosis.

This little boy is playing on a pile of asbestos waste in front of an American-owned factory. At a recent conference, an industry executive stated: "The Third World provides a rosy glow in the industry's crystal ball."

After months of waiting, Alice has finally received a small offer of compensation from Cape Asbestos.

ALICE JEFFERSON

I was really insulted because they don't know how I feel and you know for a week of this pain, what they offered me wouldn't compensate, it wouldn't. And they offered me 13,000 pounds and I mean my husband is 65 and how long is he going to be here? And you know I wouldn't wish it on my worst enemy. I wouldn't, honest. Not this. It's...I don't know...you said what do I think about Cape? I hate them. I do. I bloody hate them, and I don't know why I hate them, though I do. Because Cape is just a word.

JOHN WILLIS

Leeds High Court. Although in excruciating pain, Alice must go to court in person so that she is entitled to a more generous settlement.

ALICE JEFFERSON IN COURT

Alice Jefferson: Well, I don't think I should have to do it in the first place, not at this time, or at any other time. And expecially this morning, cuz I've had a right rough night. And I've had three rough nights. I've been walking the floor like I used to do with a baby. It hurts that much. I'm going into the hospital tomorrow by the way.

Tom Jefferson: Today.

Alice Jefferson: Today, when I've been here. So I'm hoping they'll be able to do something.

John Willis: However much compensation you get today, is it any compensation at all really for you?

Alice Jefferson: Well, what good is it now? It's no good at all, not as far as I'm concerned.

JOHN WILLIS

In Britain, most asbestos victims do not go to court. But in America, the courtroom has become the center of the asbestos controversy.

A wealthy suburb of St. Louis, Missouri. An asbestos widow, Dana Bond, sued the manufacturer of a product her husband had once used. Richard Bond had worked for just a few months with asbestos, using a process invented by Turner and Newall exported to America. Sixteen years later, this healthy fit man developed mesothelioma. His lawyers recorded this tape.

TAPED INTERVIEW

Lawyer: Are you suffering a particular illness at this time, sir? Do you understand what it is or what they call it?

Richard Bond: Yes. Pleural...pleural mesothelioma asbestosis.

Lawyer: Asbestosis and mesothelioma.

JOHN WILLIS

Three days after this testimony was taken, Richard Bond died, age 32.

Turner's and their American partners made legal history when they paid his widow 1,400,000 dollars in compensation. But even in America, sums that large are highly unusual. Ron Motley is one of the lawyers representing asbestos claimants in the United States.

RON MOTLEY

The asbestos companies and their insurers are bemoaning the fates and saying we are going to bankrupt, something's got to be done. Well, it's my opinion that they ought to go bankrupt. And I will personally be delighted if every

RON MOTLEY (Continued)

asbestos company in the United States goes bankrupt, and every one of their insurance carriers suffers a loss. Because it was the asbestos companies and their insurance companies who had the knowledge and could have stopped this epidemic of death and disease that we have in the United States from the sale of asbestos fibers. They knew. An insurance company in the United States as early as 1918 refused to insure people exposed to asbestos because they knew that it caused harm. And for 50 to 60 years with this knowledge they kept selling it and didn't tell people. So anything that happens to the asbestos companies they deserve. If they go bankrupt they deserve it.

JOHN WILLIS

Overgate Hospice, Yorkshire, England. Once again, Alice has been moved in here. She seems to be improving. News of her court case against Cape has come through.

Alice Jefferson, John Willis at Overgate Hospice

John Willis: What did you say when you heard about your settlement in court?

Alice Jefferson: Well, I was a bit upset really. Because you don't come to realize until you get a settlement made and realize what it is they are making it on and when my husband comes to me and he says they awarded you 76, er... 36,000 pounds. And I says, well, it's a new body I want, and 36,000 pounds won't buy that. You just can't give in, can you. You owe it to yourself and your family to keep fighting, don't you? And when you get knocked down, get up and stand there again and they can have another go at you. You've got to have something haven't you? I mean just because we worked at that mill all them years ago doesn't mean to say we can't fight back does it? So...and that's the sort of people mill workers are round here. They all fight back, well they try to do, but when you are dead you can't can you? So you might as well struggle on while you are alive, do your fighting then. So you have just to keep going on and putting up with it, the pain and everything.

JOHN WILLIS

A few weeks later, Alice died in her sleep. She was just 48.

Last year, world wide asbestos output rose by 2.4 percent. As Third World demand increases, output is expected to double by the end of the century.

By 1982, Turner and Newall publicly stated, "Much of the steam has gone out of the anti-asbestos lobby. There is not that much concern in the United Kingdom." Three months before a broadcast we asked Turner and Newall to answer the serious questions raised in this film. Later, we repeated the offer. Negotiations were not complete when this program was finalized.

JOHN WILLIS (Continued)

When this film was shown in Britain in July, 1982, the impact was enormous. Thousands of viewers wrote to us, deeply moved by Alice's story, wanting to help her family and the other victims of asbestos disease. Asbestos workers went on strike against their employers to improve their working conditions. Members of Parliament challenged the validity, the current regulations governing the use of asbestos. And millions of dollars were wiped off the stock exchange value of the large asbestos companies.

One of the main concerns today, is the 30 million tons of asbestos already in place. It is widely used in the construction industry. Up until 1973, it was sprayed on steel supports like these in the World Trade Center. Asbestos provides insulation and fire-proofing in thousands of buildings across the country. Workers were exposed during construction. Now every time maintenance or repair work is done, asbestos can get into the air. Whole communities are exposed whenever old buildings are demolished. Thousands of workplaces like this police station are no longer safe.

With increasing awareness have come efforts to remove or seal off the asbestos in thousands of public buildings. Only two decades ago, asbestos was required for fire protection in schools. Today, the E.P.A. has ordered an investigation to potential health hazards of more than 100,000 schools across America. Loose fibers are dangerous when inhaled. So some schools, like Newton North High, in Massachusetts, spent nearly one million dollars eliminating their asbestos hazard.

Asbestos removal is costly. Without some financial assistance, for most schools such removal is impossible.

In 1970, the U.S. Government passed the Occupational Safety and Health Act. OSHA's first priority was to regulate asbestos used in the workplace. Relying largely on British evidence they determined that it was safe to inhale two fibers per cubic milliliter of air each hour. But can there really be a safe level of exposure to asbestos?

IRVING SELIKOFF

A man who works inhales somewhere around a cubic meter of air which is a million milliliters. So that if you allow him to breathe in two fibers per milliliter, you are saying that you can breathe in two million fibers each hour.

JOHN WILLIS

In addition, millions of smaller ones, which escape detection by the monitoring equipment, are also inhaled. These fibers are surrounded by tissue and magnified 16,000 times. Research shows that even the smallest fibers can cause cancer.

IRVING SELIKOFF

The two fiber standard is, among scientists, widely known to be unsafe. And here we are, people are being allowed to work in circumstances in which they are breathing in a great deal of asbestos. Not like 30 years ago, not like 20 years ago, but still much more than we could do away with at the present time.

JOHN WILLIS

The British government, within a week of the broadcast of this film, decided to officially reduce their two fiber standard by half. In 1984, the level will probably be reduced even further. The public debate in America is still about the past. Who will pay for this monumental tragedy? How will these victims be compensated? And who will take the responsibility? While this controversy dominates newspapers and courtrooms, a small experiment is underway in Central Pennsylvania.

Port Allegheny was a typical rural town until an asbestos insulation manufacturing plant began operation. Eleven hundred workers were exposed to varying amounts of asbestos between 1964 and 1972, the eight years the plant was open. In 1973, the factory workers union, concerned about the lives of its members alerted Pittsburgh Corning to the seriousness of the problem. After four years of tough negotiations, Pittsburgh Corning finally agreed to pay for the first years of a comprehensive medical surveillance program. The Port Allegheny Asbestos Health Program is the only one of its kind in the country. From this office eligible workers are tracked down and enrolled in the program where their health care is carefully monitored. Family members whose exposure came from dust brought into the home are also examined.

Under the direction of a community Board, the union and the company work together from the success of the health program. The emphasis is on preventative health care designed to detect disease, like lung cancer in its early stages.

Because prolonged exposure to asbestos damages the lungs, doctors listen for the first indications of breathing difficulties. Participants are regularly put through a battery of tests. Most look for early signs of cancer. This pulmonary function test measures lung capacity.

PHYSICAL EXAMINATION

Doctor: ...push, push, push, push. OK.

JOHN WILLIS

Kim Klein is at risk because he worked near asbestos and he smokes cigarettes.

PHYSICAL EXAMINATION (Continued)

Doctor: You worked for the whole summer of '69?

Kim Klein: Yes.

JOHN WILLIS

If he continues to smoke, his chances of getting lung cancer are 55 times greater than non-smokers.

PHYSICAL EXAMINATION (Continued)

Doctor: It sounds to me like you are a person who can try and quit. So I encourage you to try and do that again, and we will help you if you want us to try.

JOHN WILLIS

The program can alert people to their health problems. But whether or not medical surveillance can actually prolong anyone's life is still open to debate. The commitment to this health program by a company that has thousands of law suits against it puts Pittsburgh Corning in contrast to the largest asbestos manufacturing company in the United States.

JOHN MCKINNEY (Chairman of the Board, Manville Corporation)
Manville Corporation's Board of Directors is determined that the Corporation should file for reorganization under Chapter 11 of the bankruptcy act. Though our businesses are in good shape despite the recession, we are completely overwhelmed by the cost of the asbestos health lawsuits filed against us. A recent study estimates that these may ultimately total about 52 thousand and cost more than two billion dollars. The Chapter 11 action might not have been necessary if the government has accepted financial responsibility for its role in causing much of the disease.

JOHN WILLIS

The bulk of the lawsuits now filed against Manville are from World War II shipyard workers and their families. Manville complied with the government's specific request for asbestos, and now believes that the government must shoulder some of the burden of these health claims. Manville has become one of the most sued companies in history. Five hundred lawsuits were being filed against it each month. Professor Lawrence Bacow.

LAWRENCE BACOW

Once reorganization has been filed for under Chapter 11, basically all the lawsuits will come to a halt. Nobody gets paid. In effect, Manville is throwing the ball back in the court of the federal government. Giving the responsibility to a federal judge to determine who would get paid and how much. And at the same time also putting some pressure on Congress to try and figure out a way to pay all these claims and at least from Manville's perspective hopefully bail them out.

JOHN WILLIS

Chapter 11 allows Manville to continue business as usual. At the same time they are lobbying for the establishment of a federal compensation fund. There are several bills pending now in Congress. Manville is behind a government industry 50/50 plan. However, Professor Bacow believes that industry should pay for a hefty share.

LAWRENCE BACOW

If government steps in and takes responsibility for paying off all these claims, I think industry will get the wrong message. If industry has to pay, then the cost of those payments to workers ultimately will be incorporated into the price of the product. As a result the price of the products will be higher than they would be otherwise. This would give industry an incentive to minimize the risks. It would give industry an incentive to look for alternative products which don't create risks. It will give industry an incentive to do research which can try and avoid these problems in the first place.

JOHN WILLIS

The tragic story of asbestos should be a warning to us all-- a lesson that we should prevent a similar disaster from ever happening again. Meanwhile, the price we paid for that bitter lesson has been high, paid for in the lives of ordinary people like Alice, who just went to work everyday believing it was safe...ordinary people from all over the world. Decisions that we make today will be the legacy that we leave to our children and to our children's children.

Research

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MICHAEL GATES

Film Research

ANNE JARVIS

Graphics

TREVOR HODGSON

Production Assistant

JILL TURTON

Additional Photography

FRANK POCKLINGTON

Additional Sound

TERRY RICKETTS

Sound Recordist

ROGER DAVIES

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STEVE HAYNES

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GRAHAM BARKER

Film Editors

JOHN WATTS

JOHN SURTEES

Produced and Directed by

JOHN WILLIS

YTV Colour Productions 1982

For NOVA

Written, produced and directed by
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Narrator

JOHN WILLIS

Production Assistant

JOSEPHINE PATTERSON

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Sound

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RICHARD BOCK

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Research

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Special thanks to:

*Charles River Associates
New York City Port Authority
Dr. Robert Sawyer*

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AUBREY STEWART

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Graphic Design

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Title animation generated at the
New York Institute of Technology

Executive Producer

JOHN MANSFIELD

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WGBH Educational Foundation

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DR. OSCAR AUERBACH, Senior Medical Investigator, East Orange V.A. Hospital, formerly of Mt. Sinai Hospital.

PROF. LAWRENCE BACOW, Massachusetts Institute of Technology

BARRY CASTLEMAN, Environmental Consultant.

PAUL FORMBY, Mt. Sinai Hospital research team.

DAVID GEE, National Health & Safety Officer of General & Municipal Workers Union.

ALICE JEFFERSON, Victim of cancer caused by asbestos.

TOM JEFFERSON, Alice's husband.

JOHN MCKINNEY, Acting President, Manville Corporation (Chairman of the Board, and Chief Executive Officer).

DR. ALAN MEARNES, Consultant, Bradford Royal Infirmary.

RONALD MOTTLEY, Lawyer.

DR. IRVING SELIKOFF, Mr. Sinai Hospital.

JOHN WILLIS, Commentator and narrator, producer, "Alice: A Fight for Life".

Mr. FRANK. I would repeat that there will be further hearings on this subject, particularly with regard to enforcement. The subcommittee is adjourned.

[Whereupon, at 1 p.m., the subcommittee adjourned, to reconvene subject to the call of the Chair.]

APPENDIX

MATERIAL SUBMITTED FOR THE RECORD

Manville Corporation
Ken-Caryl Ranch
Denver, Colorado 80217
303 978-2000

PO 5723

Manville

August 1, 1983

RECEIVED
AUG 1983

Honorable Barney Frank
Chairman, Manpower and
Housing Subcommittee
Committee on Government Operations
Rayburn House Office Building
Room B-349-A
Washington, D. C. 20515

Dear Congressman Frank:

Per your letter of July 11, 1983, I have reviewed the transcript testimony given by Johan A. McKinney and myself before your subcommittee on the subject Failing to Regulate: Asbestos, a Lethal Legacy. The transcripts are accurate and require no changes.

On page 113 and 114 of the transcript, you and I engaged in a question and answer exchange concerning the Navy's adoption of the Public Health Service 5 million particle per cubic foot recommended standard for exposure to asbestos. I indicated that I would provide additional information to your subcommittee. I am pleased to submit the following:

1. Two copies of BUMED Instr. 6260.5 dated November 7, 1955. These two documents are substantively the same, but the form is somewhat different. This is the first formal instruction which I have wherein the Navy incorporates 5mppcf as the appropriate exposure standard. To the extent I establish that any instruction antedated the 1955 instruction, I will so advise the subcommittee. I do not have an explanation of why the Navy Bureau of Medicine and Surgery waited from 1938 to 1955 to issue such a formal instruction.

2. I enclose a copy of a letter dated January 8, 1944, to the Navy Department, Bureau of Ships, from Phillip Drinker, Chief Health Consultant to the United States Maritime Commission in which Dr. Drinker sets forth that the 5mppcf standard for asbestos is recommended.

3. On January 14, 1981, Odyssias Athanasiou in deposition testimony concerning the Portsmouth Navy Shipyard identified a document authored by James E. Fuller, the yard medical officer and dated July 31, 1945, which

Letter to Congressman Frank
August 1, 1983
Page 2.

states in part, "the maximum allowable concentration for asbestos dust has been set by recognized authorities at 5mppcf of air."

These additional documents which are referenced for your consideration, certainly indicate that by the early 1940's the United States Navy was well aware of the 5mppcf standard for asbestos exposure and that Naval medical and industrial hygiene personnel were utilizing that standard for Naval shipyards.

It was a pleasure appearing before your subcommittee. If we may be of further assistance to the subcommittee, or if you have additional questions, please do not hesitate to contact me at your earliest convenience.

Yours truly,

Dennis H. Markusson
Assistant Corporate Counsel

Attachments

cc: J. A. McKinney
J. Lonnquist

DEPARTMENT OF THE NAVY
Bureau of Medicine and Surgery
Washington 25, D. C.

6276.3
BUMED 6276-3
BUMED-7.21-JS-cac
7 November 1955

6276.3
BUMED INSTRUCTION 6260.5

EXHIBIT # A
WITNESS # G. WATKINS
Pete S. Hunt, Reporter
DATE: 1-5-80

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Threshold limit values for toxic materials

Encl: (1) Table of Threshold Limit Values

1. Purpose. To establish as a basic reference the threshold limit values of toxic materials, adopted by the American Conference of Governmental Industrial Hygienists, and to provide guidance toward the reduction of potential health hazards encountered in the industrial environment for both military and naval civilian personnel.

2. General

a. Definition. The term "threshold limit values" as used herein is intended to indicate the maximum average atmospheric concentrations of contaminants to which personnel may be exposed during an 8-hour workday, over a prolonged period of time, without adversely affecting their health. The threshold limit values should be used as a guide in the control of health hazards and should not be regarded as fine lines between safe and dangerous concentrations. The most desirable levels in all cases are those approaching zero, but practical considerations frequently require the acceptance of higher levels which are safe but not ideal.

(1) The term "maximum allowable concentrations" is to be considered synonymous with the term "threshold limit values" defined above.

b. Threshold Limits. The threshold limit values contained in enclosure (1) are based on the best available toxicological information, long-term industrial experience, and experimental studies. Inasmuch as these values are constantly being reevaluated, revisions or additions will be made as further information becomes available.

c. Exposure to Ionizing Radiation. Threshold limits for exposure to ionizing radiation have been omitted from this Instruction. These exposures are adequately covered in NavMed P-1335, Radiological Safety Regulations.

ENCLOSURE

A

BUMEDINST 6260.5
7 November 1955

d. Limitations. The enclosed listing of threshold limit values for various chemicals does not constitute authority for the procurement or use of these items.

3. Action. The medical officer or medical department representative of each ship and station concerned shall take the following action:

a. Survey industrial operations utilizing the information contained in enclosure (1) to assist in the identification and control of potential industrial health hazards.

b. Make recommendations to the commanding officer for specific corrective actions, when required.

c. When specialist assistance for adequate survey of a ship or shore station is desired, requests should be initiated through the proper channels for the services of an industrial hygienist. This may be done in accordance with procedures outlined in NCPI 88, or by request direct to the Bureau of Medicine and Surgery.

B. W. HOGAN

Enclosure (1)

BUMEDINST 6260.5
7 November 1955THRESHOLD LIMIT VALUESAbbreviations Used. The following abbreviations are used:

PPM

Parts per million

Mg. per cu. m. (mg/M³)

Milligrams per cubic meter

MPPCF

Million particles per cubic foot

Established ValuesAdopted at the 17th annual meeting of the American Conference of Governmental Industrial Hygienists,
Buffalo, 24-28 April 1955.Gases and Vapors

Substance	PPM
Acetaldehyde	200
Acetic acid	10
Acetic anhydride	5
Acetone	1000
Acrolein	0.5
Acrylonitrile	20
Ammonia	100
Amyl acetate	200
Amyl alcohol (isoamyl alcohol)	100
Aniline	5
Arsine	0.05
Benzene (benzol)	35
Bromine	1
Butadiene (1,3-butadiene)	1000
Butanone (methyl ethyl ketone)	250
Butyl acetate (n-butyl acetate)	200
Butyl alcohol (n-butanol)	100
Butyl cellosolve (2-butoxyethanol)	200
Carbon dioxide	5000
Carbon disulfide	20
Carbon monoxide	100
Carbon tetrachloride	25
Cellosolve (2-ethoxyethanol)	200
Cellosolve acetate (hydroxyethyl acetate)	100
Chlorine	1
Chlorobenzene (monochlorobenzene)	75
Chloroform (trichloromethane)	100
1-Chloro-1-nitropropane	20
Chloroprene (2-chlorobutadiene)	25
Cresol (all isomers)	5
Cyclohexane	400
Cyclohexanol	100
Cyclohexanone	100
Cyclohexene	400
Cyclopropane	400

Enclosure (1)

BUMEDINST 6260.5
7 November 1955

Gases and Vapors (Continued)

Substance	PPM
o-Dichlorobenzene	50
Dichlorodifluoromethane	1000
1,1-Dichloroethane	100
1,2-Dichloroethylene	200
Dichloroethyl ether	15
Dichloromonofluoromethane	1000
1,1-Dichloro-1-nitroethane	10
Dichlorotetrafluoroethane	1000
Diethylamine	25
Dimethylaniline (N-dimethylaniline)	5
Dimethylsulfate	1
Dioxane (distylene dioxide)	100
Ethyl acetate	400
Ethyl alcohol (ethanol)	1000
Ethylamine	25
Ethyl benzene	200
Ethyl bromide	200
Ethyl chloride	1000
Ethyl ether	400
Ethyl formate	100
Ethyl silicate	100
Ethylene chlorohydrin	5
Ethylene dibromide (1,2-dibromoethane)	25
Ethylene dichloride (1,2-dichloroethane)	100
Ethylene oxide	100
Fluorine	0.1
Fluorotrichloromethane	1000
Formaldehyde	5
Gasoline	500
Heptane (n-heptane)	500
Hexane (n-hexane)	500
Hexanone (methyl butyl ketone)	100
Hexone (methyl isobutyl ketone)	100
Hydrogen chloride	5
Hydrogen cyanide	10
Hydrogen fluoride	3
Hydrogen selenide	0.05
Hydrogen sulfide	20
Iodine	1
Isophorone	25
Mesityl oxide	50
Methyl acetate	200
Methyl alcohol (methanol)	200
Methyl bromide	20
Methyl cellosolve (methoxyethanol)	25
Methyl cellosolve acetate (ethylene glycol monomethyl ether acetate)	25
Methyl chloride	100
Methylal (dimethoxymethane)	1000
Methyl chloroform (1,1,1-trichloroethane)	500
Methylcyclohexane	500

Enclosure (1)

2

BUMEDINST 6260.5
7 November 1955

Gases and Vapors (Continued)

Substance	PPM
Methylcyclohexanol	100
Methylcyclohexanone	100
Methyl formate	100
Methylene chloride (dichloromethane)	500
Naphtha (coal tar)	200
Naphtha (petroleum)	500
Nickel carbonyl	0.001
Nitrobenzene	1
Nitroethane	100
Nitrogen dioxide	5
Nitroglycerin	0.5
Nitromethane	100
2-Nitropropane	50
Nitrotoluene	5
Octane	500
Ozone	0.1
Pentane	1000
Pentanone (methyl propyl ketone)	200
Perchloroethylene (tetrachloroethylene)	200
Phenol	5
Phosgene (carbonyl chloride)	1
Phosphine	0.05
Phosphorus trichloride	0.5
Propyl acetate	200
Propyl alcohol (isopropyl alcohol)	400
Propyl ether (isopropyl ether)	500
Propylene dichloride (1,2-dichloropropane)	75
Stibine	0.1
Stoddard solvent	500
Styrene monomer (phenyl ethylene)	200
Sulfur monochloride	1
Sulfur dioxide	10
1,1,1,2-Tetrachloroethane	5
Toluene	200
o-Toluidine	5
Trichloroethylene	200
Turpentine	100
Vinyl chloride (chloroethene)	500
Xylene	200

Toxic Dusts, Fumes, and Mists

Substance	Mg. per cu. m.
Antimony	0.5
Arsenic	0.5
Barium (soluble compounds)	0.5
Cadmium	0.1
Chlorodiphenyl	1

BUMEDINST 6260.5
7 November 1955

Toxic Dusts, Fumes, and Mists (Continued)

Substance	Mg. per cu. m.
Chromic acid and Chromates as CrO_3	0.1
Cyanide, as CN	5
Dinitrotoluene	1.5
Dinitro-o-cresol	0.2
Fluoride	2.5
Iron oxide fume	15
Lead	0.15
Magnesium oxide fume	15
Manganese	6
Mercury	0.1
Parathion (O,O-Diethyl-O-p-nitrophenyl thiophosphate)	0.1
Pentachloronaphthalene	0.5
Pentachlorophenol	0.5
Phosphorus (yellow)	0.1
Phosphorus pentachloride	1
Phosphorus pentasulfide	1
Selenium compounds (as Se)	0.1
Sulfuric acid	1
Tellurium	0.1
Tetryl (2,4,6-trinitrophenylmethyl nitramine)	1.5
Trichloronaphthalene	5
Trinitrotoluene	1.5
Uranium (soluble compounds)	0.05
Uranium (insoluble compounds)	0.25
Zinc oxide fumes	15

Mineral Dusts

Substance	MPPCF
Alumina (aluminum oxide)	50
Asbestos	5
Carborundum (silicon carbide)	50
Dust (miscellaneous, no free silica)	50
Mica (below 5% free silica)	20
Portland cement	50
Talc	20
Silica	
high (above 50% free SiO_2)	5
medium (5 to 50% free SiO_2)	20
low (below 5% free SiO_2)	50
Slate (below 5% free SiO_2)	50
Soapstone (below 5% free SiO_2)	20
Total dust (below 5% free SiO_2)	50

Tentative Threshold Limit Values

The following tentative values have been suggested for further consideration and it is proposed that the entire list will be presented for adoption at the meeting of the American Conference of Governmental Industrial Hygienists in 1956, if no reason to the contrary is forthcoming.

Enclosure (1)

BUMEDINST 6260.5
7 November 1955

Tentative Threshold Limit Values (Continued)

Aldrin (1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a,-hexahydro-1,4,5,8-dimethanonaphthalene)	0.25	mg/M ³
Allyl alcohol	5	ppm
Allyl propyl disulfide	2	ppm
Ammonate (ammonium amidosulfate)	15	mg/M ³
Benzyl chloride	1	ppm
Butyl amine	5	ppm
Butyl mercaptan	10	ppm
Calcium arsenate	0.3	mg/M ³
Chlordane (1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindane)	2.0	mg/M ³
Chlorine trifluoride	0.1	ppm
Chlorinated diphenyl oxide	0.5	mg/M ³
Crag Herbicide (sodium-2,4, dichlorophenoxy ethyl sulfate)	15	mg/M ³
2,4-D (2,4-dichlorophenoxyacetic acid)	10	mg/M ³
D.D.T. (2,2-bis-(p-chlorophenyl)-1,1,1-trichloroethane)	2.0	mg/M ³
Diacetone alcohol (4-hydroxy-4-methyl pentanone-2)	50	ppm
Diborane	0.1	ppm
Dieldrin (1,2,3,4,10,10-hexachloro-6,7, epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4,5,8-dimethanonaphthalene)	0.25	mg/M ³
Difluorodibromomethane	100	ppm
Diisobutyl ketone	50	ppm
EPN (ethyl-p-nitrophenyl thiono benzene phosphonate)	0.5	mg/M ³
Ethyl mercaptan	250	ppm
Ethylene diamine	10	ppm
Ethylene imine	5	ppm
Ferro vanadium dust	1	mg/M ³
Furfural	5	ppm
Furfuryl alcohol	200	ppm
Hydrazine	1	ppm
Hydrogen bromide	5	ppm
Hydrogen peroxide, 90%	1	ppm
Hydroquinone	2	mg/M ³
Isopropylamine	5	ppm
Lead arsenate	0.2	mg/M ³
Lindane (hexachlorocyclohexane, gamma isomer)	0.5	mg/M ³
Malathion (O,O-dimethyl dithio phosphate of diethyl mercaptosuccinate)	15	mg/M ³
Methoxychlor (2,2-diparamethoxyphenyl-1,1,1, trichloroethane)	15	mg/M ³
Methyl acetylene	1000	ppm
Methyl isobutyl carbinol (methyl amyl alcohol)	25	ppm
Methyl mercaptan	50	ppm
Molybdenum		
(soluble compounds)	5	mg/M ³
(insoluble compounds)	15	mg/M ³
p-Nitroaniline	1	ppm
Organo mercurials (as mercury)	0.01	mg/M ³
Perchloromethyl mercaptan	0.1	ppm
Phenylhydrazine	5	ppm
Picric acid	0.1	mg/M ³
Propylene imine	25	ppm
Pyridine	10	ppm
Quinone	0.1	ppm

BUMEDINST 6260.5

7 November 1955

Tentative Threshold Limit Values (Continued)

Sodium hydroxide	2	mg/M ³
Sulfur hexafluoride	1000	ppm
Sulfur pentafluoride	0.025	ppm
TEDP (tetraethyl dithiono pyrophosphate)	0.2	mg/M ³
TEPP (tetraethyl pyrophosphate)	0.05	mg/M ³
p-Tertiary butyl toluene	10	ppm
Tetrahydrofuran	75	ppm
Tetranitromethane	1	ppm
Titanium dioxide	15	mg/M ³
Trifluoromonobromomethane	1000	ppm
Vanadium		
(V ₂ O ₅ dust)	0.5	mg/M ³
(V ₂ O ₅ fume)	0.1	mg/M ³
Zirconium	5	mg/M ³

Encil Note:
Mr. Noonan
May 2, 1957
J. J. Noonan

C O P Y

140/12 BSI

DEPARTMENT OF THE NAVY
Bureau of Medicine and Surgery
Washington 25, D. C.

RECEIVED

BUMED 6260.5
BUMED-7231-JS-c
7 November 1955

BUMED INSTRUCTION 6260.5

APR 26 1957
ELECTRIC BOAT DIVISION
GENERAL DYNAMICS CORP.

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Threshold limit values for toxic materials

Encl: (1) Table of Threshold Limit Values

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(1) The term "maximum allowable concentrations" is to be considered synonymous with the term "threshold limit values" defined above.

b. Threshold limits. The threshold limit values contained in enclosure (1) are based on the best available toxicological information, long-term industrial experience, and experimental studies. Inasmuch as these values are constantly being reevaluated, revisions or additions will be made as further information becomes available.

c. Exposure to Ionizing Radiation. Threshold limits for exposure to ionizing radiation have been omitted from this Instruction. These exposures are adequately covered in Navmed F-1325, Radiological Safety Regulations.

3d C001240

8UNEDINST 6260.5
7 November 1955

d. Limitations. The enclosed listing of threshold limit values for various chemicals does not constitute authority for the procurement or use of these items.

3. Action. The medical officer or medical department representative of each ship and station concerned shall take the following action:

a. Survey industrial operations utilizing the information contained in enclosure (1) to assist in the identification and control of potential industrial health hazards.

b. Make recommendations to the commanding officer for specific corrective actions, when required.

c. When specialist assistance for adequate survey of a ship or shore station is desired, requests should be initiated through the proper channels for the services of an industrial hygienist. This may be done in accordance with procedures outlined in NSPI GS, or by request direct to the Bureau of Medicine and Surgery.

B. W. HOGAN

Pencil Note:

This letter is - Referenced in NSI 9190.26

Ser: 533P-451 of 15 Mar 1957

cc: W. Ames
F. Dubois
W. Harvey
H. Fife
F. Kohrs
R. Madden
A. Whitman
F. Moran
Dr. McDougal
H. Sheets

sd

C 001241

Enclosure (1)

7 November 1955

THRESHOLD LIMIT VALUESAbbreviations Used. The following abbreviations are used:

PPM	Parts per million
Mg. per cu. m. (mg/M ³)	Milligrams per cubic meter
MPMCF	Million particles per cubic foot

Established Values

Adopted at the 17th annual meeting of the American Conference of Governmental Industrial Hygienists, Buffalo, 24-28 April 1955.

Gases and Vapors

Substance	PPM
Acetaldehyde	200
Acetic acid	10
Acetic anhydride	5
Acetone	1000
Acrolein	0.5
Acrylonitrile	20
Ammonia	100
Amyl acetate	200
Amyl alcohol (isoamyl alcohol)	100
Aniline	5
Arsine	0.05
Benzene (bensol)	35
Bromine	1
Butadiene (1,3-butadiene)	1000
Butanone (methyl ethyl ketone)	250
Butyl acetate (n-butyl acetate)	200
Butyl alcohol (n-butanol)	100
Butyl cellosolve (2-butoxyethanol)	200
Carbon dioxide	5000
Carbon disulfide	20
Carbon monoxide	100
Carbon tetrachloride	25
Cellosolve (2-ethoxyethanol)	200
Cellosolve acetate (hydroxyethylacetate)	100
Chlorine	1
Chlorobenzene (monochlorobenzene)	75
Chloroform (trichloromethane)	100
1-Chloro-1-nitropropane	20
Chloroprene (2-chlorobutadiene)	25
Cresol (all isomers)	5
Cyclohexane	400
Cyclohexanol	100
Cyclohexanone	100
Cyclohexene	400
Cyclopropane	400

C 001242

Enclosure (1)

Toxic Dusts, Fumes, and Mists (Continued)

Substance	Mg. per cu. ft.
Chronic acid and Chromates as CrO_3	0.1
Cyanide as CN	5
Dinitrotoluene	1.5
Dinitro-o-cresol	0.2
Fluoride	2.5
Iron oxide fume	15
Lead	0.15
Magnesium oxide fume	15
Manganese	5
Mercury	0.1
Parathion (O,O-Diethyl-O-p-nitrophenyl triphosphate)	0.1
Pentachloronaphthalene	0.5
Pentachlorophenol	0.5
Phosphorus (yellow)	0.1
Phosphorus pentachloride	1
Phosphorus pentasulfide	1
Selenium compounds (as Se)	0.1
Sulfuric acid	1
Tellurium	0.1
Tetryl (2,4,6-trinitrophenylmethylnitramine)	1.5
Trichloronaphthalene	5
Trinitrotoluene	1.5
Uranium (soluble compounds)	0.01
Uranium (insoluble compounds)	0.2
Zinc oxide fumes	15

Mineral Dusts

Substance	MPPCD
Alundum (aluminum oxide)	50
Asbestos	5
Carborundum (silicon carbide)	50
Dust (nuisance, no free silica)	50
Mica (below 5% free silica)	20
Portland cement	50
Talc	20
Silica	
high (above 50% free SiO_2)	5
medium (5 to 50% free SiO_2)	20
low (below 5% free SiO_2)	50
Slate (below 5% free SiO_2)	50
Soapstone (below 5% free SiO_2)	20
Total dust (below 5% free SiO_2)	50

Tentative Threshold Limit Values

The following tentative values have been suggested for further consideration and it is proposed that the entire list will be presented for adoption at the meeting of the American Conference of Governmental Industrial Hygiene in 1956, if no reason to the contrary is forthcoming.

Enclosure (1)

4

001243

Box 400
539-2UNITED STATES MARITIME COMMISSION
WASHINGTON55 Shattuck St.
Boston 15, Mass.

January 8, 1944

RECEIVED

AUG 17 1981

R 10 Jan

LEGAL DIVISION

Bureau of Ships
Navy Department
Washington, D. C.

Gentlemen:

Attn: Captain Ingram, Room 2074, Building T5

Yesterday I received a long distance call from Mr. W. G. Hazard, Industrial Hygiene Division of New Jersey, Trenton, New Jersey, in which Mr. Hazard stated that the union men at New York Shipbuilding Co. had asked their help regarding the use of Amosite for pipe insulation on Navy vessels they are constructing.

I happen to know the union official, McCloskey, who is not easily put off and who is distinctly on the reasonable side. They ask: (1) how generally is Amosite used, (2) will the Navy allow the use of anything else, and (3) what protection, if any, is needed.

It seems to me these are reasonable questions and should be answered. I know Hazard very well - he is a U. S. Public Health Service officer assigned to New Jersey for the duration. His only desire is to help the company get on with its job and do it without damaging anyone's health.

Hazard stated that Dr. Goldman of the Bethesda Labs (U.S.P.H.S.) found the Amosite to be mostly asbestos. Dust counts in the room where the men were working were very much higher than anyone would recommend - they ran up to 25 million. A figure of 5 million for asbestos is recommended.

If this material must be used, I suggest the men be required to wear Bureau of Mines dust respirators approved for the nuisance dusts, or else that the material be applied wet. If the latter expedient is impracticable the job ought to be ventilated.

We would point out that we had some bad spots in baby aircraft carrier construction at our Kaiser Vancouver yard. After a little bit of work with the Labor-Management group we got the men to wear air line respirators and they now use them without making any objection. The use of dust respirators in both Navy and Maritime yards is sketchy. Both organizations could save a lot of trouble by having them used more - just as the mining industry has done.



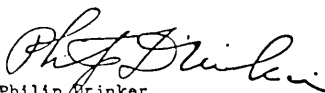
1200588 - A

UNITED STATES MARITIME COMMISSION
WASHINGTON

Page 2.

Please write or telephone as soon as possible as the matter is urgent. We can easily have a labor disturbance, especially if we ignore the complaint. It may be better to handle it verbally - hence the request that you telephone me (LONGwood 2330). I will then phone Hazard at once or you can.

Sincerely yours,



Philip Brinker
Chief Health Consultant

Cc: Comdr. H. K. Sessions
U. S. Maritime Commission
Philadelphia, Penna.



NOV 1947	S 39 2	CODE 330
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DEPOSITION
EXHIBITATH 3

From: Industrial Hygiene Laboratory
To: The Yard Medical Officer

Subj: Report of Investigation of Potential Health Hazard in
Connection with Pipe-Covering Operations.

1. Recent reports from outside Industrial Hygiene Agencies indicate that the increased quantities of asbestos-insulation products used in shipbuilding, under the stress of wartime production schedules have been accompanied by a growing concern among workers who feared that exposure to some of these products was causing injury to their health. This concern, in all probability, has a basis in fact as evidenced by diagnoses of primary and advanced asbestosis, among a significant number of shipyard pipe coverers, based upon physical examination data and x-ray findings.

2. In the light of this information, it seemed that a detailed engineering study of activities involved in the use of these products should be made in order to determine whether or not the extent of exposure to asbestos dust in this Yard constituted a health hazard. All asbestos-containing materials capable of producing dusty atmospheres when handled were identified and the shops to which they were issued investigated. Procedures and operations in connection with their use and percent of workers' time engaged in handling these materials were studied. Atmospheric dust counts were made during the various steps of the operations involved together with petrographic examinations of the starting materials and air-borne dusts. Following is a more detailed description of the work done in this connection and the results of the study.

3. . Various products containing asbestos are used in the Navy Yard, but, from the standpoint of dust creation, pipe-covering materials were considered to be of greatest importance. The likelihood of any material hazard to health arising from the use of other asbestos products, such as, packing and gasket materials

would seem to be negligible. This study, then was limited to pipe-covering operations exclusively. The products used in connection with these operations together with consumption data listed in Table I.

4. Pipe Covering is done by three different shops:

- | | |
|------------------|---|
| (a) Pipe Shop | (56), All covering on ships afloat. |
| (b) Power Plant | (93), Yard maintenance; All steam and hot water lines ashore. |
| (c) Public Works | (70), Yard maintenance; All cold water pipes ashore. |

Although the same number of workers (forty) are involved in both the Pipe Shop and the Power Plant, the nature of the work, types of materials used and relative manhours of actual exposure seemed to indicate that the Pipe Shop potentially involved the greater hazards to health. For this reason the majority of samples were taken in connection with activities in this shop. The conditions under which the samples credited to the Power Plant were taken were conducive to far greater dust concentrations than any other operations. Inasmuch as these tests did not reveal hazardous exposures, further tests in this shop were not thought to be necessary. Public Works pipe-covering activities were deemed unimportant as regards dust creation, and therefore, tests were considered unnecessary. Only one type of covering, a relatively non-dusty "Air-Cell" asbestos paper, was used and only 3% of the workers' time was spent in direct contact with this material.

5. A breakdown of the distribution of all pipe-covering personnel, for the purpose of expressing the relative time exposed to the various pipe covering materials used, is presented in Table II.

6. All dust counts referred to in this report were collected and quantitated by means of a Zeiss Konimeter. A complete tabulation of the results of these counts and field work accomplished is contained in Table III. Mechanical exhaust ventilation is not employed in connection with any pipe-covering or asbestos handling operations in the Yard. Respiratory protection by means of an approved type of respirator is used by only one worker during band-sawing operations.

7. The maximum allowable concentration for asbestos dust has been set by recognized authorities at 5 million particles per cubic foot of air. In all cases, the tests revealed that actual exposures in this Yard were well below this value. However, outside observers have recently reported cases of asbestosis among workers exposed

to concentrations found to be below this accepted threshold limit. In view of this fact, it would seem advisable to conduct physical examinations, including chest x-rays, on all asbestos pipe coverers, or at least upon those who have been continuously employed at the trade for five years or more, in order to definitely determine whether or not any of the men engaged in these operations in the Yard are being affected under present working conditions, and to serve as a guide to the recommendations of control measures, if necessary.

8. This matter has been brought to the attention of the Medical Officer for Industrial Hygiene and examinations are being conducted as recommended.

JAMES E. FULLER

TABLE I

Trade Name	Trade Name	Manufacturers	Percent Asbestos Content	Percentage Consumption in Shops	Asbestos Used per Month
site	"Unarco" Insbestos Felt (large padding)	Union Asbestos & Rubber Co. Chicago, Ill.	98	40	2000 56 03 70
Magnesia	"Powdered Magnesium"	Johns Manville	11	10 35	2000 56 03 70
Red	"Magnesia Pipe Insulation"	Johns Manville			2000 56 03 70
	"Plant" 85%	Plant Rubber & Asbestos Works San Francisco, Calif.		10 35	240 300 56 03 70
	Magnesia Pipe Insulation	Union Asbestos & Rubber Co.	5		240 300 56 03 70
	"Unarco" Insbestos Pipe Covering (Precision Molded)	Unarco Chicago, Ill.			240 300 56 03 70
	"Plant" 85%	Plant Rubber & Asbestos Works San Francisco, Calif.			240 300 56 03 70
	Pipe Covering	Asbestos Limited, Inc. New York	9	2 20	20 30 56 03 70
	"New Era" Pipe Covering	Asbestos Limited, Inc. New York	9	2 20	20 30 56 03 70
	"Hi-Temp."	N.E. Asbestos Co. Boston, Mass.	4	1	20 30 56 03 70
	"Air-Cell"	Philip Carey, Co. Olan, O.		100	20 30 56 03 70
		Armstrong Cork Co. Lancaster, Pa.		36	20 30 56 03 70
		Owens --- Fiber- glass Corp.		1 10	20 30 56 03 70

These data is based upon present conditions and may be subject to wide variations.

TABLE II

SHOP No.	Pipe Coverers	Distribution of Workers	85% Magnesla		Amosite (Felt)	Corrugated Paper Moulded	Cork	Fibre
			Block Molded & Powdered					
56	40	New Con. 44% Ships/Repair 44% Shop 12%	Percent of Workers Using Materials	5 22	10	--	32	--
			Percent of Working Time Handling Materials	60 40	70	--	10	1
03	40	Steam & Hot Water Yard Maintenance 100%	Percent of Workers Using Materials	20 15	--	--	--	--
			Percent of Working Time Handling Materials	70 70	--	--	--	--
70	6	Cold Water Maintenance 100%	Percent of Workers Using Materials	-- --	--	100	--	--
			Percent of Working Time Handling Materials	-- --	--	3	--	--

This data is also subject to change. For example, in February, 84% of the pipe-covering work by Shop 16 was on new construction on ships afloat and 4% on repair. As the table indicates, at the present time the relationship is 44% to 44%. It is expected that in three months about 24% will be new construction and 6% on repair. It can be expected that an increase in the amount of repair work done on ships would be accompanied by possible excessive asbestos dust exposures from a greater amount of work involving the stripping off of old insulation.

TABLE IV

PETROGRAPHIC ANALYSIS OF SETTLED DUST SAMPLES

Sample No.	Location	Particles by Count $<10 \mu$	Asbestos 200μ long ($<5 \mu$)	Other Fibers (Organic glass)	Serpentine	Diatomaceous Earth	F0203 Opaque	CO ₂	Others
1	(155) Issue Room, On Shelf 4 ft. from table	98	4	tr.	6	2	45	13	15
2	Sewing Room On window ledge 5 ft. from machine	98	6	tr.	5	tr.	42	16	21
3	Main Shop On window casing (window cut) 1 ft. from table	98	9	tr.	9	tr.	38	28	16
4	(150) Cutting Room, On Rafter 6 ft. from saw	98	4	tr.	8	5	8	51	24
5	(153) Stock Room On boxes Corner of room	98	10	tr.	5	8	31	27	19

U.S. Department of Labor

AUG 08 1983

Assistant Secretary for
Occupational Safety and Health
Washington, D.C. 20210



Honorable Barney Frank
Chairman, Manpower and Housing
Subcommittee
Committee on Government Operations
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in response to your letter of July 1, regarding correspondence of April 18, May 5, May 17, and May 24, 1983, between Milan Racic, Health and Safety Director of the International Union of Allied Industrial Workers of America, and Alan C. McMillan, Region V Administrator of the Occupational Safety and Health Administration (OSHA). The following addresses the questions you have raised concerning OSHA's enforcement of the asbestos standard.

1. Neither Mr. Racic's letters of April 18 nor of May 17, 1983, constitutes a request for inspection under the Occupational Safety and Health Act (the Act) or its implementing regulations. His letters call OSHA's attention to notification by the Environmental Protection Agency (EPA) that demolition is taking place at worksites which contain asbestos. The letters are general inquiries about action OSHA is taking to protect workers at the demolition sites. There is no indication in either letter of improper handling of asbestos or of other hazards to which employees may be exposed. There are no allegations that asbestos is being handled improperly at a specific worksite or that safety and health hazards exist.

A complaint to OSHA, in order to elicit an inspection, must specify a hazardous condition. A complaint does not have to allege a specific asbestos exposure level, but must assert that a hazard exists in the workplace or that there has been a violation of the Act.

I am enclosing a copy of Chapter IX of OSHA's Field Operations Manual, which sets forth the criteria for an employee complaint and describes OSHA's policies for handling such complaints.

2. As Mr. McMillan's letter of May 5 states, the reports from EPA to OSHA regarding demolition sites do not indicate any violations of OSHA's asbestos standard or of the Agency's general duty requirements [under section 5(a)1 of the Act] to maintain a workplace free from recognized hazards likely

-2-

to cause death or serious physical harm to employees. EPA's reports contain no indication that demolition work is being done in a hazardous manner. OSHA's inspection data do not indicate any statistical probability of a greater number of violations of the asbestos standard at demolition sites than at other workplaces where asbestos is handled.

3. The EPA reports of demolition indicate only the presence of asbestos at a worksite, not the manner in which employees are being exposed or the amount of the substance present. These reports are based on notification to EPA by the contractors involved. For purposes of scheduling OSHA inspections, a better measure of the relative health hazard would be the degree to which workers are exposed to asbestos, taking into consideration the work practice controls and personal protective equipment used. Employee complaints about employers who allegedly violate OSHA standards are a good way of directing Agency compliance resources to actual, rather than merely potential hazards. Moreover, contractors who notify EPA of demolition work involving asbestos are less likely to disregard OSHA regulations than those who fail to notify EPA of such projects. In any case, OSHA does not ignore the reports transmitted by EPA. We are currently examining data on demolition sites to determine where such workplaces fit into inspection priorities. All sources of data are being considered during this review.
4. OSHA has not conducted any asbestos-related inspections at the worksites cited in the lists provided by Mr. Racic. As explained in response #3, the data provided by Mr. Racic do not necessarily indicate asbestos hazards and have not appeared to us to provide a sufficient basis for targeting inspections. We are, however, as stated, reviewing this policy.
5. OSHA has no jurisdiction over the general public as distinct from workplace employees. Section 4(a) of the Act states that: "This Act shall apply with respect to employment performed in a workplace in a State...." The Environmental Protection Agency as well as the state and local health agencies have authority to protect the public from toxic substances and other dangers. Despite the statutory limitation on its authority, OSHA's policy under this Administration is to supply information on the elimination of workplace hazards to the extent possible when such information is sought.


-3-

6. The portion of the FOM referred to by Mr. McMillan, Chapter IX of the FOM, is enclosed as noted in response #1.
7. In the past two and a half years OSHA has instituted a management system that ensures uniform administration of the Act by all OSHA field offices. OSHA managers are held strictly accountable for their performance in every aspect of OSHA's compliance program and all other Agency programs. OSHA has issued a formal statement of Agency goals and objectives and has developed specific indicators of effectiveness to provide OSHA management information on the conformity of the Field Offices to OSHA's policies, goals and priorities. One of these indicators tracks the Agency's response to employee complaints. Also, Area Offices are audited by Regional Office personnel, who check to see that enforcement guidelines established by OSHA's National Office are followed. In addition representatives of OSHA's national office periodically audit the 10 Regional Offices, checking case files to ensure consistency of enforcement policy.

At a meeting on July 21 between your staff and mine, the recent Cabinet Council meeting on OSHA's Federal Agencies Program, about which you inquire, was discussed in some detail. I did not have prepared remarks on that occasion and so cannot supply you with a copy of my presentation. As soon as the President's message on this subject has been issued, we will forward a copy to you.

If you have further questions, we will be happy to oblige. We appreciate your continuing interest in occupational safety and health.

Sincerely,



Thorne G. Auchter
Assistant Secretary

Enclosure

CHAPTER IX

COMPLAINTS AND REFERRALS

A. Complaints.

1. General. The discussion of complaints in this chapter is confined to when a complaint is received and processed at the Area Office before an inspection rather than when it is given to the CSHO at the time the establishment is inspected. (See OSHA Instruction CPL 2.12B, Appendix B, for sample letters.)
 - a. Agency Response. The agency's response to a complaint will take a variety of forms, ranging from an inspection to a response by letter, depending upon the formality of the complaint, the nature of the hazard and the abatement response of the employer.
 - b. Complainant Identity. The identity of formal and nonformal complainants who wish to remain anonymous will be kept confidential, pursuant to Section 8(f)(1) of the Act.
2. Definitions. The following definitions apply in this chapter:
 - a. Complaint. A complaint is a notice of a hazard or a violation of the Act believed to exist in a workplace given by an employee or representative of employees to the Secretary or his authorized representative.
 - (1) To constitute a complaint the notice must allege that a hazard exists in the workplace or that the Act (meaning also a standard or regulation) is violated.
 - (a) If the notice is so vague and unsubstantiated that the Area Director is unable to make a reasonable judgment as to the existence of the alleged workplace hazard, there is no valid complaint. In such a case, however, every reasonable attempt shall be made to contact the person giving the notice to obtain more specific information.
 - (b) If, as a result of a recent inspection or on the basis of other objective evidence, the Area Director determines that the hazard which is the subject of the notice is not present; e.g., it has already been corrected, such a notice is not a valid complaint.
 - (2) The workplace must be one wherein OSHA's jurisdiction has not been preempted under Section 4(b)(1) of the Act. Thus, if the notice involves conditions inside a mine, any hazard or violation clearly falls within an area wherein OSHA's jurisdiction has been preempted. In such a circumstance the notice is not a complaint. Such notices shall be promptly referred to the appropriate agency for its action.

OSHA Instruction CPL 2.45A

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Office of Compliance Programming

- b. Employee. For purposes of submitting a complaint, an employee is either of the following:

- (1) A present employee of the employer about whose establishment the complaint is being made.
- (2) A present employee of another employer if that employee is working at or near some other employer's workplace and is exposed to hazards of that workplace.

NOTE: Former employees are not considered employees for purposes of submitting a formal complaint. They can only submit nonformal complaints.

- c. Representative of Employees. For purposes of submitting a complaint, a representative of employees is any of the following:

- (1) An authorized representative of the employee bargaining unit, such as a certified or recognized labor organization;
- (2) An attorney acting for an employee;
- (3) Any other person acting in a bona fide representative capacity, e.g., a member of the employee's family. In this situation, a complainant purporting to act as a representative of an employee shall be presumed to be so acting unless the CSHO obtains information that the complaint was not submitted with the knowledge of or on behalf of the employee.

- d. Formal Complaint. To meet the formality requirements outlined in Section 8(f) of the Act and in 29 CFR 1903.11, a complaint shall:

- (1) Be reduced to writing (either on an OSHA-7 Form or in a letter);
- (2) Allege that an imminent danger or a violation threatening physical harm (i.e., a hazard covered by a standard or by the general duty clause) exists in the workplace;
- (3) Set forth with reasonable particularity the grounds upon which it is based. This does not mean that the complaint must specify a particular standard; it need only specify a condition or practice that is hazardous and, if uncommon, why it is hazardous; and
- (4) Be signed by at least one employee or employee representative.
- (5) The following are examples of deficiencies which would result in the failure of an apparent formal complaint to meet the requirements of the definition:

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- (a) A thorough evaluation of the complaint does not establish reasonable grounds to believe that the alleged violation can be classified as an imminent danger or that the alleged hazard is covered by a standard or, in the case of an alleged serious condition, by the general duty clause (Section 5(a)(1)).
 - (b) The complaint concerns a workplace condition which has no direct relationship to safety or health and does not threaten physical harm; e.g., a violation of a recordkeeping or other regulation or a violation of a standard that is classified as de minimis.
 - (c) The complaint alleges a hazard which violates a standard but describes no actual workplace conditions and gives no particulars which would allow a proper evaluation of the hazard. In such a case the Area Director shall make a reasonable attempt to obtain such information.
- e. Nonformal Complaint. Any complaint, such as the examples given under A.2.d.(5), which does not meet any or all of the formality requirements in A.2.d. is a nonformal complaint and is to be handled in accordance with the procedures in A.8.
- (1) Examples. Other examples of such complaints include the following:
 - (a) Oral complaints filed by employees.
 - (b) Unsigned written complaints filed by employees.
 - (c) Written and oral complaints filed by nonemployees (persons or groups other than current employees or their representatives).
 - (d) Complaints of hazards not covered by a standard or by the general duty clause.
 - (e) Complaints of violations of regulations (rather than standards).
 - (f) Complaints of violations of standards that are classified as de minimis.
 - (2) Referrals from Other Agencies. Reports from sources listed in B.2.b, however, are referrals and are to be handled in accordance with the procedures in B.3.
3. Receiving Complaints. An incoming notice of hazards or alleged violations shall first be referred to a designated professional who shall obtain all available information from the person reporting it. The notice shall thereafter be forwarded to the supervisor to complete the evaluation.

OSHA Instruction CPL 2.45A

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- a. Employee Rights. When an oral notice is received from an employee or employee representative, that person shall be informed of the right to file a formal complaint in writing under Section 8(f)(1) and of the right, as a matter of law and OSHA policy, to have the complainant's identity held confidential, if requested, regardless of the formality of the complaint.
- b. Workplace Inspections. The person giving notice shall be informed that formal complaints generally lead to workplace inspections while nonformal complaints usually result in letters requesting employers to undertake corrective action.
- c. Formalizing Oral Complaints. If the person is filing a notice orally and makes a request to formalize the complaint, the supervisor or designated professional, after confirming that the complainant is an employee or employee representative, shall complete the Complaint, OSHA-7 Form, to the extent possible prior to mailing for the complainant's signature.
 - (1) If the signed complaint form is not returned within 10 working days, it shall be treated as a nonformal complaint; and a letter shall be sent to the employer. If, nevertheless, a signed complaint is received after 10 working days but before a letter has been sent to the employer, the complaint is to be considered formal and evaluated as such.
 - (2) If a complainant filing orally declines to formalize his complaint, the supervisor or designated professional shall nevertheless attempt to obtain the complainant's name, address and telephone number.
- d. Section 11(c) Complaint. The complainant shall be advised of the protection against discrimination afforded by Section 11(c) of the Act and shall be informed of the procedure for filing an 11(c) complaint.
 - (1) Safety and/or health complaints filed by former employees who allege that they were fired for exercising their rights under the Act are nonformal complaints and will not be scheduled for investigation.
 - (a) Such complaints will be handled in accordance with the procedures outlined in Chapter X, C.1, and transmitted to the appropriate 11(c) personnel for investigation of the alleged 11(c) discrimination complaint.
 - (b) No letter shall be sent to the employer until after the Regional 11(c) Supervisory Investigator has reviewed the case and decided that it will not be returned to the Area Director for inspection.
 - (c) This screening process by the Regional 11(c) Supervisory Investigator is not anticipated to take more than 3 work days and usually less. The Area Director can expect to be informed by telephone of the decision within that time frame.

OSHA Instruction CPL 2.45A

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Office of Compliance Programming

- (2) In those instances where the Regional 11(c) Supervisory Investigator determines that the existence or nature of the alleged hazard is likely to be relevant to the resolution of the 11(c) discrimination complaint, the matter shall be sent back to the Area Director for an OSHA inspection to be handled in the manner indicated in B.2.b.(3).
 - (3) When, as in most cases, the decision is that no inspection is necessary, the Area Director shall proceed to send a letter to the employer as outlined in A.8.
 - (4) Any 11(c) complaint alleging an imminent danger shall be handled in accordance with the instructions in A.6.
4. Evaluating Complaints. A careful exercise of investigatory techniques is necessary for complete evaluation of complaints.
 - a. Classification. Immediately upon receipt of a notice reporting a hazard or an alleged violation, the supervisor shall decide if the notice meets the definition of a complaint. If so, the complaint shall be classified as formal or nonformal.
 - b. Documentation. Supervisory personnel shall evaluate complaints with all evaluation decisions fully documented in the establishment case file including all information obtained pursuant to the procedures outlined in this chapter.
 - c. Both Safety and Health Hazards Alleged. When a complaint alleges both safety and health hazards, the complaint shall be referred to both safety and health supervisors for evaluation. They shall coordinate the handling of the complaint. Supervisors shall maximize the use of cross-trained CSHOs to conduct complaint inspections involving both safety and health hazards.
 - d. Response to Person Reporting. Whenever the Area Director decides that a notice which fails to meet the definition of a complaint given in A.2.a. will not be responded to or that a complaint submitted by an employee or representative of employees which fails to meet all of the formality requirements given in A.2.d. will not be inspected, a letter shall be sent to the person submitting the notice (certified with return receipt) communicating that decision and the reasons for it. The person shall be informed that he or she has a right to appeal this decision to the Regional Administrator for an informal review.
5. Information Needed for Complaint Evaluation. As stated in A.4, supervisory personnel shall evaluate complaints. The Complaint OSHA-7 Form shall normally be used to record both formal and nonformal complaints. Most complaints will be relatively unsophisticated and lacking in details. Thus, the complainant will normally have to be contacted, when possible, either for additional facts or to verify facts supplied. The evaluator must exercise professional

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judgment on the basis of the information available to decide whether or not there are reasonable grounds to believe that a violation exists and, if so, how it should be classified.

- a. Taking Complaints. When the designated OSHA professional receives a complaint, by letter, in person or over the telephone, the OSHA-7 Form shall be completed. If the complainant wishes to submit a formal complaint, the person taking the complaint shall ask if the complainant is presently an employee or employee representative. If the complaint has been received in writing and has been signed, the complainant shall be contacted, if necessary, for response to questions on the OSHA-7 although the form need not be sent for signature.
- b. Additional Information. Additional information is usually needed to improve the quality of the complaints and to aid in determining their priority. Therefore, in completing item 4 on the OSHA-7, an attempt shall be made to obtain detailed answers to the following questions:

(I) For All Complaints.

- (a) Describe the unsafe or unhealthful conditions; identify the location. What is the nature of the exposure?
- (b) What is the work being performed in the unsafe/unhealthful area? Identify, as well as possible, the type and condition of equipment in use, the materials (chemicals) being used, the process/operation involved, and the kinds of work being done near the hazardous area.
- (c) How often is work done at the task which leads to the exposure? For how long at one time? How long has the condition existed as far as can be determined? Has it been brought to the employer's attention? Have any attempts been made to correct the condition?
- (d) How many shifts are there? What time do they start? On which shift does the hazardous condition exist?
- (e) What personal protective equipment is required by the company? Is it used by employees? Include all PPE and describe it as specifically as possible. Include the manufacturer's name and any identifying numbers.
- (f) How many people work in the establishment? How many are exposed to the hazardous conditions? What is their proximity?
- (g) Is there an employee representative in the establishment? Include the name, address, and phone number of the union and/or of the employee representative(s).

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- (h) Identify the standard(s) apparently violated by the conditions described by the complainant.

(2) For Health Hazards.

- (a) Has the employer administered any tests to determine employee exposure levels to the hazardous conditions or substance? Describe these tests. What have been the results?
- (b) What engineering controls are in place in the area(s) in which the exposed employees work? For instance, are there any fans or acoustical insulation in the area which may reduce exposure to the hazard?
- (c) What administrative or work practice controls has the employer put into effect?
- (d) Do any employees have any symptoms which may have been caused by exposure to hazardous substances? Have any employees ever been treated by a doctor for a work-related disease or condition? What was it? Have there been any "near-miss" incidents?

(3) For Safety Hazards.

- (a) Under what adverse or hazardous conditions are employees required to work? (This should include conditions contributing to stress and "other" probability factors.)
- (b) Have any employees been injured as a result of this hazardous condition? Have there been any "near-miss" incidents?

6. Responding to Complaints Alleging Imminent Danger Conditions. Any complaint which, in the professional opinion of the Area Director or supervisor constitutes an imminent danger, as defined in Chapter VII, shall be inspected irrespective of whether or not it meets the formality requirements of Section 8(f)(1). It shall be inspected the same day received, where possible, but not later than the employer's next working day after receipt of the complaint.
7. Responding to Formal Complaints. All formal complaints meeting the requirements of Section 8(f)(1) of the Act and 29 CFR 1903.11 shall be scheduled for workplace inspections.
- a. Determination. Upon determination by the supervisor that a complaint is formal, an inspection shall be scheduled in accordance with the priorities in A.7.b.

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- b. Priorities for Responding by Inspections to Formal Complaints. Inspections resulting from formal complaints shall be conducted according to the following priority:
 - (1) Formal complaints, other than imminent danger, shall be given a priority based upon the classification and the gravity of the alleged hazards as defined in Chapters IV and VI.
 - (2) Formal complaints involving potentially serious hazards shall be investigated within 5 working days; those involving other-than-serious conditions, within 30 working days.
- 8. Responding to Nonformal Complaints. All nonformal complaints shall receive a response. The procedures described below include responses to nonformal complaints designed to ensure correction of hazards identified in the complaint:
 - a. Responding by Letter to Nonformal Complaints. Upon receipt and evaluation of a nonformal complaint, the Area Director, as soon as possible, shall prepare a letter to the employer advising him of the complaint, informing him of the standards allegedly violated (including copies of such standards) and outlining the corrective action required. This letter shall be sent by certified mail with return receipt requested.
 - (1) Posting. The employer shall be requested to post copies of OSHA's letter of notification referred to in the previous subparagraph together with all subsequent correspondence dealing with the complaint items including the employer's response until such time as the case is closed by the Area Office. The employer shall be informed that a copy of the letter and subsequent correspondence will be sent to the complainant.
 - (2) Letter to Complainant. Concurrent with the letter to the employer, a letter to the complainant shall be prepared explaining that the employer has been informed of the complaint. It shall request the complainant to notify the Area Director if no corrective action has been taken or at least initiated within 30 calendar days (or less if so indicated in the letter to the employer) or if any adverse or discriminatory action or threats are made against the complainant. A copy of the letter to the employer shall be included with the letter to the complainant. The complainant shall also be sent a copy of all subsequent correspondence.
 - (3) Employer Response. If a response is received from the employer and it appears that appropriate corrective action has been taken or that no hazard is present, the case file shall be closed. The complainant shall be informed of all responses received from the employer.
 - b. Responding by Inspection to Nonformal Complaints. Where the employer fails to respond or submits an inadequate response within the period specified in the letter or where the complainant informs OSHA that no correc-

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tive action has been taken or the action taken is inadequate, the Area Director shall contact the employer to determine what further action he plans to take. If no action has been taken and none is planned, the nonformal complaint shall be activated for inspection pursuant to the priorities in A.7.b.(2).

- (1) Status of Corrective Action. Where an ambiguity exists or where the employer has a correction plan which he has not yet had time to implement fully, the Area Director shall communicate further, as appropriate, with the employer and/or the complainant to determine what interim protective steps have been taken until the corrective action shall have been completed and, later, whether the hazard has been adequately corrected. On the basis of information available, the Area Director shall decide whether an inspection is warranted.
- (2) Tenth Letter Inspections. Where employers have sent satisfactory corrective action letters, the Area Director shall, nevertheless, select every tenth letter for inspection to ensure that the employer's action corresponds to that asserted in the corrective action letter. Only satisfactory letters shall be included in this procedure. Letters shall be numbered in order of receipt by the Area Office. Employers shall be informed at the time that the initial letter is sent out that they are subject to such "tenth letter" inspections.

9. Scope of Inspection. The scope of complaint inspections shall be determined in accordance with the guidelines given in this section. Any departure from these guidelines shall be supported by adequate documentation.
 - a. Safety Complaint Inspections. The inspection of a safety complaint shall normally be a comprehensive inspection of the entire workplace (except for low-hazard areas, such as office areas). The following guidelines shall be followed in determining exceptions:
 - (1) Records Review. In a high rate manufacturing establishment (one whose primary SIC code is listed on the Area Office High Rate SIC List), an injury records review, as outlined in Chapter III, shall be performed. If such a records review would not result in a comprehensive safety inspection under the guidelines in that chapter, the procedures in d. of this section for a complaint inspection in a low-rate industry shall apply.
 - (2) Deletion Criteria. If one of the deletion criteria in Chapter II applies to a general industry establishment, the procedures in d. shall apply.
 - b. Construction and Longshoring Inspections. In the construction and longshoring industries, if a substantially complete inspection of the establishment has been conducted within the last quarter, the procedures in d. shall apply.

- c. Health Complaint Inspections. The inspection of a health complaint in a SIC code industry that is listed on the Health Inspection Plan will normally be a comprehensive inspection of all areas where a potential serious health problem may exist. Otherwise the procedures outlined in d. for a complaint in a low rate industry shall apply.
 - d. Low-hazard Industry Complaint Inspections. Generally, a complaint inspection in a low-hazard industry should be limited to working conditions identified in the complaint. If, however, the CSHO believes that the scope of the inspection should be expanded because of information indicating the likelihood of serious hazards in other portions of the plant (e.g., the CSHO has observed them prior to the opening conference or the records review shows that an unusual number or type of injuries has occurred in one time period, area or operation), or because of a formal complaint alleging imminent danger or serious hazards received while conducting the inspection, the supervisor shall be contacted. A decision will then be made on the basis of the information that is available whether the inspection is to be extended.
 - e. Advising Participants of Extended Scope. Whenever an extended inspection is to be conducted, the CSHO shall advise the employer and the employee representatives of the extended scope at the opening conference or at the earliest opportunity.
10. Procedures. In general, the procedures in Chapter III shall be followed in conducting complaint inspections. Particular attention, however, is directed to the following special requirements for complaint investigations:
- a. Copy of the Complaint. A copy of the complaint shall be given to the employer at the opening conference.
 - (1) In the case of a multi-employer worksite, such as a construction site, a copy of every complaint, including those against subcontractors, shall be provided to the general contractor as well as to the employer against whom the complaint has been filed.
 - (2) A copy of every complaint against the general contractor or against one or more of the subcontractors shall be provided, if possible, to each subcontractor whose employees may be exposed to the alleged hazard.
 - b. Identity of Complainant. Section 8(f)(1) of the Act requires that, if the complainant so requests, names shall be deleted from the employer's copy of the complaint. If handwritten, the complaint shall be typed, and reworded if necessary, so that the identity of the complainant cannot be discerned by the employer.

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- c. Walkaround Rights. In a complaint inspection the walkaround rights of an employer and an employee representative shall be applicable in accordance with Chapter III. The employee representative will be chosen according to the procedures in Chapter III and, thus, the complainant will not necessarily be the employee representative for walkaround purposes.
- d. Results of Inspection to Complainant. After the completion of an inspection based on a formal or a nonformal complaint (except for a tenth letter inspection), the complainant shall be informed of the results as follows:
 - (1) Each complaint item shall be addressed with a reference to a citation item on an attached copy of the OSHA-2 issued as a result of the complaint inspection and/or with a sufficiently detailed description of the findings and why they did or did not result in a citation.
 - (2) The complainant shall be informed, if he/she so desires, of any subsequent modification of the citation due to an informal conference, a settlement agreement, or a decision of the Review Commission or a court, together with the reasons for the modification.
- e. Notification of Delays. If unusual delays are met in issuing a citation resulting from a complaint inspection, the complainant and, if appropriate, the employee representative shall be informed of such delays. A delay of more than 15 working days following the inspection would warrant such notification.
- f. Citation Not Warranted. If the Area Director determines that a citation is not warranted, the complainant shall be informed in writing of such determination as outlined in A.8.d.(1). At the same time, the complainant shall be notified of OSHA's policy granting the right of informal review of the Regional Administrator's determination and the procedure for obtaining such a review, which is the same as that set forth in 29 CFR 1903.12(a) for review of the decision not to inspect.
- g. Communication to Complainant. Written communications to a complainant shall be sent to the employee's home address unless specific instructions have been given that such mail be sent to the place of employment.

B. Referrals.

- 1. General. As a rule, referrals will be handled in a manner similar to that of complaints.
- 2. Definitions. For purposes of this chapter, a referral is normally distinguished from a complaint by the source providing information on the alleged hazard.
 - a. Notices of hazards or alleged violations originated by the sources listed in b. of this section shall be considered as referrals except as noted in b.(3).

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All other reports of hazards shall be considered as complaints, including employee complaints transmitted to the agency by 18(b) States. Formal and nonformal complaints received by other government agencies and simply forwarded to OSHA for action are complaints since they do not originate with the agency or its employees. (See B.2.b.(4).)

b. Referrals may originate from the following sources:

- (1) CSHO Referrals. Subject to the exception in the note to Chapter II, E.2.b.(3)(d) 2, serious hazards shall normally be investigated by the CSHO who observes them (after consultation with the supervisor if required).

(a) Types of Referrals. There are two types of CSHO referrals.

- 1 Safety (Health to Safety or Safety to Safety).
- 2 Health (Safety to Health or Health to Health).

- (b) Subject of CSHO Referrals. Generally, CSHO referrals shall be limited to potentially serious hazards observed during an inspection or visible from or in public areas, such as streets, highways or the public areas of business premises.

- (c) Circumstances. There are circumstances when a CSHO referral may be necessary or appropriate, such as the following:

- 1 The CSHO lacks the necessary expertise.
- 2 The CSHO observing the hazard is already assigned to an inspection of higher priority.
- 3 The CSHO observes specific evidence of imminent danger or serious hazards at a worksite not programmed for an inspection.
- 4 Equipment necessary for an inspection is not available at the time.
- 5 Efficient utilization of Area Office resources requires that a referral be made; e.g., the size of the workplace, the number of employees involved, the length of time likely to be required for an inspection, the extent of hazards observed, etc.
- 6 The observations occur outside the CSHO's normal working hours.

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NOTE: For inspection classification purposes, if a CSHO lacks the expertise to handle all complaint items or to complete an imminent danger or fatality/catastrophe investigation or for some other reason requires assistance from another CSHO, such assistance shall be counted as part of the original complaint, imminent danger or fatality/catastrophe and not as a referral. Such assistance shall not be counted as a separate inspection unless another discipline is involved (e.g., safety to health or health to safety).

- (2) Safety and Health Agency Referrals. This category includes referrals by NIOSH, 18(b) State programs, 7(c)(1) consultation programs, and 11(c) investigators.

NOTE: For purposes of assigning an inspection priority, referrals from these sources will be considered as equivalent to CSHO referrals, although not counted as such by IMIS.

- (3) 11(c) Nonformal Complaint Referrals. Regional 11(c) Supervisory Investigators may decide to send nonformal complaints (Section 11(c) discrimination complaints which also allege hazardous working conditions or violations of OSHA regulations) to the Area Director for investigation under the procedures in A.3.d.
- (a) If originally received in the Area Office and referred to the 11(c) personnel for handling of the discrimination complaint as outlined in Chapter X, C.1, such complaints will already have been recorded in at the Area Office as nonformal complaints if they also include a notice which meets the definition of "complaint."
 - (b) If the complaint was originally filed with 11(c) personnel, it shall be recorded in by the Area Office as a nonformal complaint.
 - (c) When a nonformal complaint is received from the Regional 11(c) Supervisory Investigator with a recommendation for inspection, it shall be scheduled for inspection and assigned a priority in accordance with A.7.b.(2).
- (4) Other Government Agency Referrals. Notifications of hazards observed and reported (referred) to OSHA by other Federal, State or local government agencies or their employees; e.g., EPA, Federal Grain Inspection Service, local building inspectors, fire marshals, etc., are included in this category.
- (a) Such notifications are referrals when non-government employees are exposed to the alleged hazards.

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- (b) Reports by federal employees, their supervisors, or their representatives of unsafe or unhealthful working conditions within their own workplaces and to which they are exposed (as provided for in Executive Order 12196) shall, of course, continue to be handled as complaints in accordance with Federal Agency Program procedures currently in effect.
- (5) Media Reports. Reports of accidents involving serious injury or of potentially serious workplace hazards in the media shall be considered as referrals. "Reports" shall be understood to include news items reported in the media as well as hazards reported directly to OSHA by media sources. Thus newspaper or magazine articles or photographs or news items reported over radio or television are examples of media reports as well as calls to the Area Office by reporters.
- c. Referral inspections are unprogrammed inspections and, except for complaints received from 11(c) personnel, shall be recorded in the Area Office using the OSHA-90 Form.
- 3. Procedures. Each referral shall be evaluated as thoroughly as possible in accordance with the guidelines for evaluating complaints given in A.4. to determine whether there are reasonable grounds to believe that a safety or health hazard exists. If so, the hazard shall be classified as imminent danger, serious or other-than-serious. Referrals to be inspected shall be assigned a priority by the supervisor according to the severity of the alleged hazard.
 - a. When the CSHO observes an imminent danger situation under the circumstances outlined in B.2.b.(1)(c) 3, the supervisor shall be contacted immediately, if practicable. Otherwise, an inspection shall be conducted without delay and the supervisor informed as soon as possible after the inspection has been initiated.
 - b. If, after evaluation, the supervisor determines that a CSHO referral or a referral from a safety and health agency should be classified as other-than-serious, such a referral shall be handled by letter in accordance with d. of this section.
 - c. Other government agency referrals shall normally be handled by letter according to the instructions for nonformal complaints in A.8.a.
 - (1) A letter shall be sent to the employer whenever a name and address is given in the referral or is obtainable with reasonable effort. Letters similar to those used for complaints shall be used for referrals also if the most appropriate one is revised in accordance with the particular circumstances of the referral.

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- (2) If no name or address is obtainable, the referring agency shall be notified by telephone of this fact and shall be informed that OSHA can take no action without being supplied with such information.
- (3) When a letter is sent to the employer, the procedures in A.8. are applicable, except that no tenth letter inspections shall be scheduled.
- d. There can be extraordinary circumstances when the Area Director may decide that a Government agency referral identifies a hazard of such a potentially serious nature that it warrants being placed in the same inspection priority as media reports.
- e. In the case of media reports, reasonable efforts to corroborate the information contained in the report shall be made whenever necessary. Specifically, the supervisor shall attempt, before scheduling an inspection, to determine if the incident is related to an apparent violation of a standard. This may be done by carefully reviewing the facts as reported by the media or, when indicated by the particular circumstances, by contacting a third party such as the police, the ambulance service or, in rare cases, by calling the employer.
- f. Media reports of other-than-serious hazards will not normally require an agency response.
- g. Except for 11(c) referrals as noted in B.2.b.(3), referrals will not normally result in an inspection unless they involve potentially serious hazards. Consequently, referrals scheduled for inspection shall be investigated within 5 working days.
- h. No letter of acknowledgment or followup communication with the referring source will be necessary for referrals.
- i. The scope of referral inspections shall be decided in accordance with the guidelines for complaints in A.9.
- j. A case file shall be set up for each referral as it is received. This case file shall contain a copy of the completed OSHA-90, all documentation supporting the evaluation and classification of the referral and subsequent action documents. If an inspection is eventually performed, all of the material will be absorbed into the inspection case file.

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NINETY-EIGHTH CONGRESS

Congress of the United States

House of Representatives

MANPOWER AND HOUSING SUBCOMMITTEE
 OF THE
 COMMITTEE ON GOVERNMENT OPERATIONS
 RAYBURN HOUSE OFFICE BUILDING, ROOM B-349-A
 WASHINGTON, D.C. 20515

July 1, 1983

Thorne Auchter
 Assistant Secretary for Occupational
 Safety and Health
 U.S. Department of Labor
 200 Constitution Avenue
 Washington, DC 20210

Dear Mr. Auchter:

Thank you for appearing before the Manpower and Housing Subcommittee on June 28. After your testimony, recent correspondence between Mr. McMillan and Mr. Racic (attached) was presented to the Subcommittee, casting doubt on OSHA's vigilant enforcement of the asbestos standard. I have held the hearing record open until July 15, 1983 to give you an opportunity to clarify OSHA's position as provided by Mr. McMillan.

Please specifically address the following points in your response:

1. Does each letter from Mr. Racic (April 18 and May 17, 1983) constitute a request for an inspection under 29 CFR 1903.11? If not, why not? Does the complaint need allege a specific exposure level to asbestos? Please provide the respective OSHA policy used to determine what constitutes a request for inspection.
2. Mr. McMillan's May 5th reply states that these reports "do not indicate any evidence of a violation." Does this mean that OSHA believes these EPA reports indicate no evidence of a violation? Given what is known about work practices in demolition sites containing asbestos, is it not reasonable to presume from these reports there is a likelihood or some possibility of a violation of the asbestos standard? Based on OSHA's inspection data base, how much more likely are these demolition worksites than other worksites to have asbestos violations?
3. Given OSHA's attempts to target inspections, are not such reports valuable information that can assist OSHA in identifying hazardous worksites?

Page 2.

4. Did OSHA inspect any of the worksites contained in the EPA reports? If not, why not? If so, please provide the number (and by type) of citations, violations, and penalties as well as the asbestos exposure levels that were found?
5. Mr. McMillan's May 5, 1983 letter states, "OSHA has no jurisdiction over the general public." Does this mean that OSHA has no jurisdiction and has issued no directives or regulations to protect the general public from hazards emanating from the work place? In addition to airborne asbestos, other examples in this area might include falling debris, manholes, trenches, machinery, and explosives.
6. Please provide the FOM policy Mr. McMillan referred to in his May 24 letter.
7. Mr. McMillan states that his office is following the respective FOM. Nonetheless, allegations have been made that regional offices are not consistently following this policy. Please describe by what methods you can assure the Subcommittee that this policy is being consistently adhered to in all regional offices.

Additionally, during your testimony you referred to a recent presentation to the Cabinet Council (see enclosed request) that is expected to result in a message or memorandum from the President. I will appreciate your supplying the Subcommittee with a copy of your presentation and the President's message.

The Subcommittee appreciates your cooperation. I look forward to your reply by July 15, 1983.



BARNEY FRANK
Chairman, Manpower and Housing
Subcommittee

BF/jc
enclosures

DOMINICK D'AMBROSIO
INTERNATIONAL PRESIDENT
WILLIAM J. SALAMONE
INTERNATIONAL SECRETARY

INTERNATIONAL UNION

Allied Industrial Workers
OF AMERICA
AFFILIATED WITH THE A.F.L.-C.I.O.



Telephone
414-645-9500

A. I. W. BUILDING
3520 WEST OKLAHOMA AVENUE
MILWAUKEE, WISCONSIN 53215

May 17, 1983

Mr. Michael Connors
Deputy Regional Administrator
U.S. Dept. of Labor
OSHA-32nd Floor
230 S. Dearborn Street
Chicago, Illinois 60604

Dear Mr. Connors:

Enclosed is a copy of the latest U.S. EPA Region V "Notification of Demolition (Friable Asbestos)." Please let us know if your office is regularly receiving this information from the U.S. E.P.A. If your office is, we would like to know what is being done to prevent exposures to employees and the general public at these work locations? Please list your actions in the same order or provide information on the U.S. EPA forms in column designated "Results of inspections."

I hope that we do not have to discuss here the merits of trying to prevent unnecessary asbestos exposures. I think that OSHA should take action and try to assure that asbestos is either removed prior to the demolition or otherwise handled in a way consistent with OSHA's asbestos standard.

We believe that OSHA has an obligation to act since they are being informed that the demolition of buildings containing asbestos is taking place. Not acting on this information given to your agency at least as a referral requiring field investigations including air sampling, will not be consistent with OSHA's mandate under the act - to provide safe and healthful workplace.

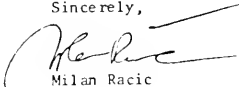
Michael Connors
May 17, 1983
Page 2

Please provide us with specific information requested above and also with an answer to our request for field inspections of all workplaces listed in this U.S. EPA notification and other similar information in the future.

At the same time would you please discuss this matter with your people in Washington, D.C. so that we are assured that this new inspection policy will cover all ten Regional Offices of OSHA.

Your prompt action and response is appreciated.

Sincerely,



Milan Racic
Health and Safety Director

MR/ab
opeiu#9afl-cio

12

U.S. Department of Labor

Occupational Safety and Health Administration
230 South Dearborn Street
Chicago, Illinois 60604



May 5, 1983

Mr. Milan Racic
Health and Safety Director
ALLIED INDUSTRIAL WORKERS OF AMERICA
AIW Building
3520 West Oklahoma Avenue
Milwaukee, WI 53215

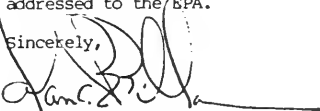
Dear Mr. Racic:

This is in response to your letter of April 18, 1983, regarding EPA demolition work sites which contain asbestos.

As this information is received from EPA, it is transmitted to the Area Office which has jurisdiction. Since these reports do not indicate any evidence of a violation of our asbestos standard, they are not processed as referrals. Therefore these reports are informational only and are maintained in the event that an inspection is scheduled at a facility during the time frame of the demolition or renovation.

I should also note that OSHA has no jurisdiction over the general public in these or any areas. That portion of your inquiry should be more appropriately addressed to the EPA.

Sincerely,


Alan C. McMillan
Regional Administrator



U.S. Department of Labor

Occupational Safety and Health Administration
230 South Dearborn Street
Chicago, Illinois 60604



May 24, 1983

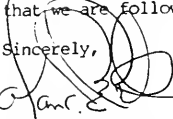
Mr. Milan Racic
Health and Safety Director
ALLIED INDUSTRIAL WORKERS OF AMERICA
AIW Building
3520 West Oklahoma Avenue
Milwaukee, WI 53215

Dear Mr. Racic:

This is in response to your recent letter which expanded upon your inquiry of April 18, 1983, regarding EPA's "Notification of Demolition (Friable Asbestos)." I responded to your original letter on May 5, 1983. That letter addressed the questions which are discussed in your recent correspondence.

Please note that our policy regarding this issue is discussed in our FOM and that we are following that guideline.

Sincerely,


Alan C. McMillan
Regional Administrator



DOMINICK D'AMBROSIO
INTERNATIONAL PRESIDENT
WILLIAM J. SALAMONE
INTERNATIONAL SEC. Y. TREAS.

INTERNATIONAL UNION

Allied Industrial Workers
OF AMERICA
AFFILIATED WITH THE A.F.L.-C.I.O.



Telephone

414-645-9500

April 18, 1983

A. I. W. BUILDING
3520 WEST OKLAHOMA AVENUE
MILWAUKEE, WISCONSIN 53215

Mr. Alan C. McMillan
Regional Administrator
U.S. Dept. of Labor
OSHA-32nd Floor
230 S. Dearborn Street
Chicago, Illinois 60604

Dear Mr. McMillan:

Enclosed is a list of demolition work sites that we received from the U.S.EPA. According to this document, these buildings did contain friable asbestos.

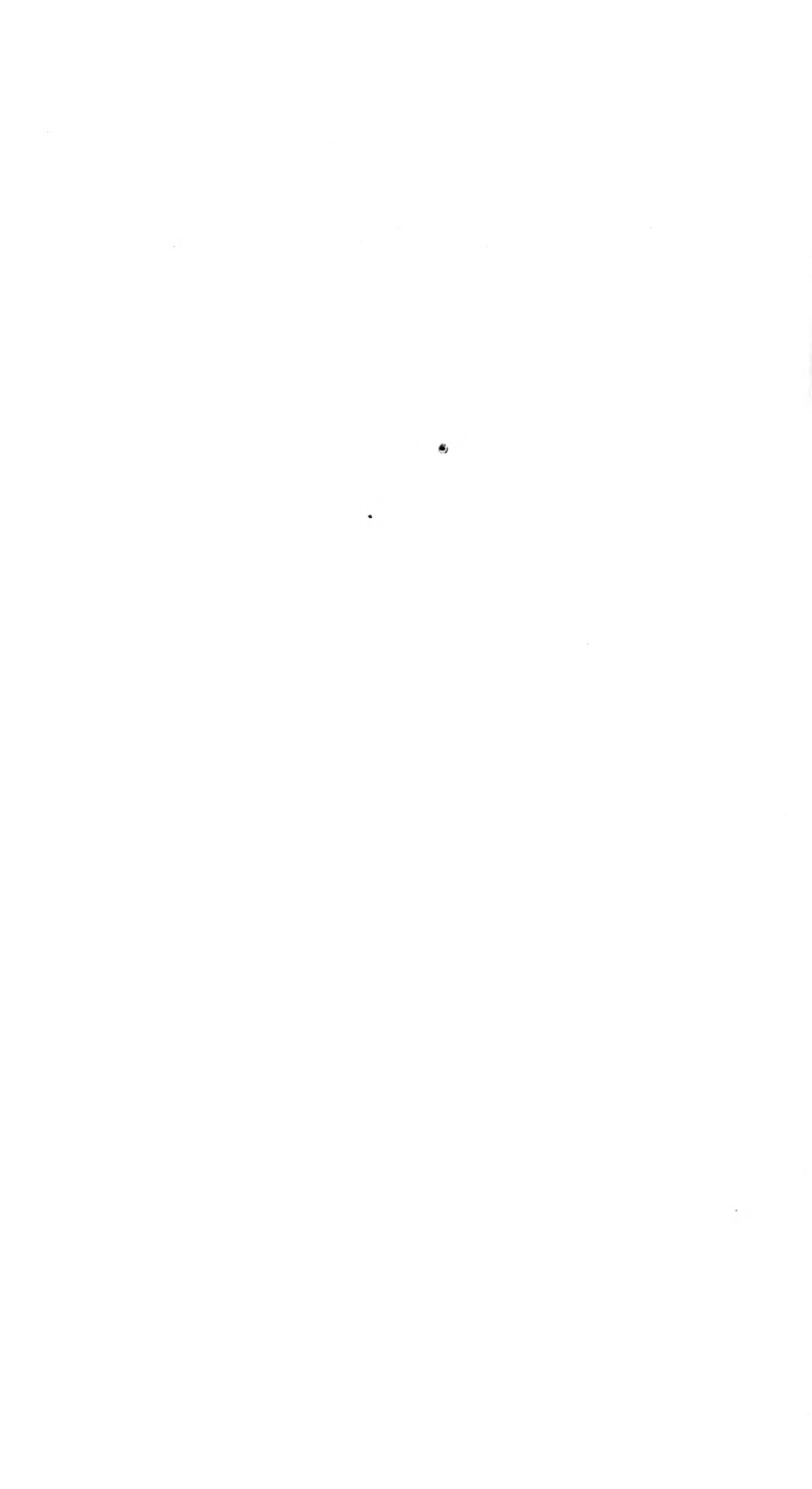
Please let me know what action did your office take to insure that workers at these work sites and the general public in the surrounding areas were not exposed to asbestos fibers.

Your prompt response is appreciated.

Sincerely,

Milan Racic
Milan Racic
Health and Safety Director

MR/ab
opeiu#9af1-cio





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